“THE FAR EASTERN REVIEW” – CHINESE RAILWAY CONSTRUCTION

A COMPREHENSIVE STUDY OF HISTORICAL REFERENCES WITHIN THE LIFE OF THIS JOURNAL OF THE DEVELOPMENT & CONSTRUCTION OF CHINA’S EARLY RAILWAYS, INCLUDING EXTRACTS OF RELEVANT PAGES **(SECTION 8 of 14)**

For Introduction please see preface to Volumes I - V

(Note : to view the relative pages of the magazine, scroll down to end of these notes for each volume, respectively
)

Volume XXI

Note: In this volume G.B. Rea continues with a journal heavy on political commentary and with fewer articles about engineering projects. The useful “Engineering Notes” at the rear of each monthly number are absent.

January 1925

Test of Three-Cylinder Locomotive for South Manchuria Railway A derailed description of a new type of 2-8-2 locomotive built by ALCo for the S.M.R. 2 photos, multiple engineering drawings with specifications.

Motive Power Development on the Peking-Suiyuan Railway Engineer, J. K. Wong provides a description of locomotives deployed on the steep-inclined P-S Railway with ever more powerful locomotives being ordered foe the line. 5 photos of ALCo engines supplied for the line and five tables listing engines and the sections they are deployed on.

February 1925

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.

International Control of China’s Railways Editorial explaining that Japan was opposing any “international control” over China’s railways. This was attributed by some (mainly Britain) alleging Japan was in fact pushing “aggressive designs on China’s sovereignty”.

Penchihu An illustrated description of the “Penchihu” (本溪 *Benxi*) iron ore mines, blast furnace and coal working in and around Benxi on the South Manchuria’s Mukden-Antung Railway.

March 1925

China's Railways Description of the "deplorable" condition of China's railways due to regional warlords and their soldiers commandeering trains for their personal use and leaving them almost destroyed. 1 photo of the flag-adorned "International Express" train from Peking-Tientsin which was still guarded by international troops.

A Year in Tientsin An article describing how floods had damaged bridges but that prosperity was still surviving in Tientsin and that bridges being repaired or improved. 3 small photos, including a troop train at Tientsin station.

Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders.

April 1925

The Drewry Car Company Small advertisement for Drewry rail cars & locomotives.

Bethlehem Steel Export Corp. One-page advertisement for U.S. steel products for railways.

Chinese Eastern Railway Magazine Advertisement for a new magazine published in Harbin.

May 1925

Brill Self-Propelled Cars. Advertisement for J.G. Brill's Model 75 gasoline rail car.

Head Quarter of the Chinese Eastern Railway Guard Small photo of the CER Guard's HQ building at Harbin.

Reconstruction of the Kiaochow-Tsinan Railway Bridges. F. K. Sah, Chief Engineer of the railway describes how railway bridges were about to be rebuilt with stronger structures. 2 photos

The Tientu Light Railway J.W. Kelker describes the building and erection of Baldwin 0-6-4 locomotives for this new railway across the Tumen River near Kwenei. The 2ft. 6 in gauge line would extend to the Tienbaushan silver and copper mines. 5 small photos of locomotives being erected.

Worthington Locomotive Feed Water Heater Awarded Medal Article describing the invention of a boiler feed pump and heater. One of which was fitted to a Kowloon Canton Railway tank locomotive. Several photos including 1 of the K.C.R locomotive.

The Soya Bean in Manchuria Illustrated article describing the importance of the Soya bean industry and its relationship with the S.M.R. 5 small photos, including Mukden station.

June & July 1925

Note: A very thick (over 350 pages with adverts) combined two-month special magazine dedicated entirely to Japanese engineering. This mammoth product of Editor G.B. Rea demonstrates his growing admiration for the Japanese and their international diplomacy. These two months (with the exception of one advert) contain no articles about Chinese railways.

Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders. Includes 1 photo of saddle tank built for the S.N.R. Most likely an engine built by Bagnall in 1905. (repeat)

August 1925

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.

A Study in Extraterritoriality An article by E. Lennox Simpson speculating on the arrest on 3rd. October 1924 of the Russian Boris Ostroumoff, who had been General Manager of the CER for four years. (Note: Lennox Simpson was a Customs commissioner and writer who published under the name "B.L. Putnam Weale". He was murdered in 1930, some claim he was assassinated by the Japanese.

September 1925

Unification of Administrative Control of the Railroads of China Article by Yeh King-Cho, Minister of Communications about his proposal to assert central control over the railways.

The Lunghai Railway Eastern Extension Illustrated description of the latest extension to the Lunghai Railway being carried out under Dutchman, E. R. Hondelink's supervision. Sketch map and photographs.

October 1925

Financial Independence of the Administration of Communications of the Republic of China. A second article by Yeh King-Cho, Minister of Communications advancing his plans to assert financial control over the railways.

November 1925

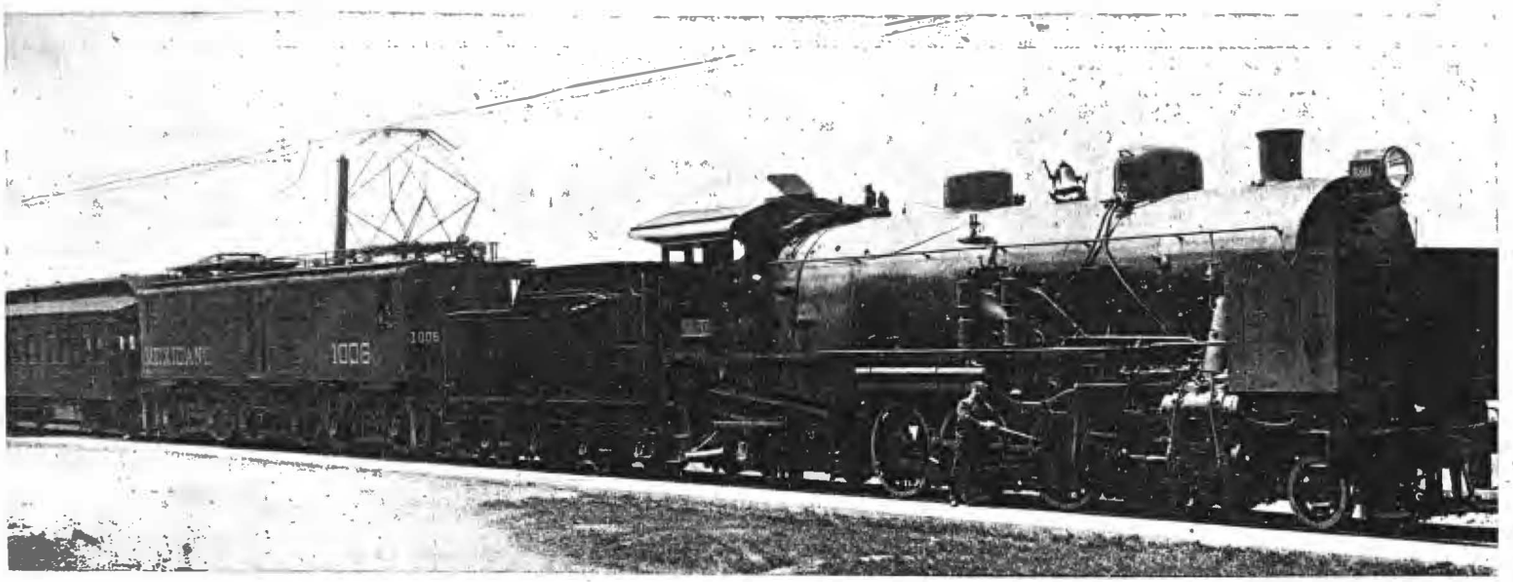
Proposed Train-Ferry Schemes for Nanking-Pukow and Wuchang-Hankow. A 3-page article by P.H. Chen with suggestions for train ferries at Nanking and Hankow. Multiple engineering sketches for train-loading piers and gangways.

December 1925

Armstrong-Whitworth Advertisement for British engineering works and locomotive-building company.

The Port of Tsingtao Description of the harbour and wharf and the relationship with the Shantung Railway. Photos and sketch map showing the railway lines entering the port and wharf.

/ continued on page 173



American Locomotive Co.—General Electric Co. Test of S.M.R. 190-Ton 3-Cylinder Locomotive Using 150-Ton 3,000 volt Mexican Locomotive for Regenerative Load

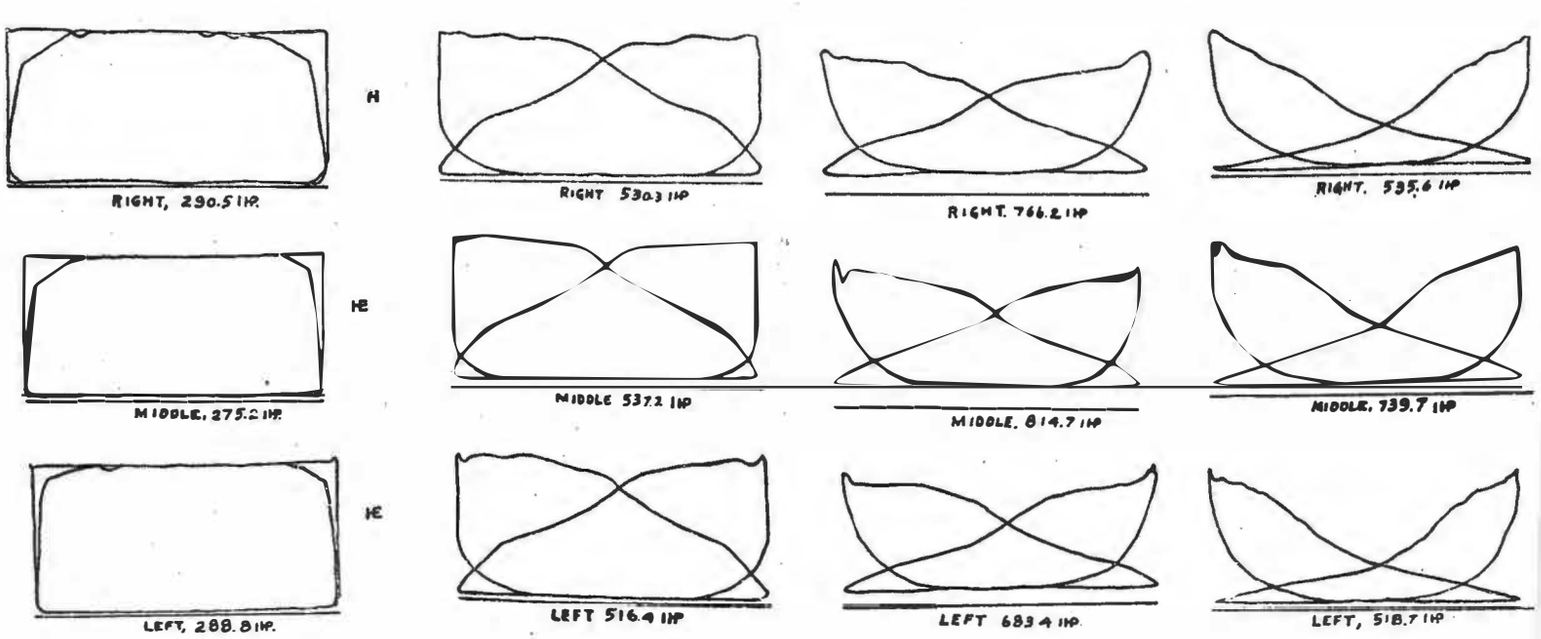
Test of Three-Cylinder Locomotive for the South Manchurian Railway

An account of recent tests on a three-cylinder locomotive for the South Manchurian Railway, conducted on the test track of the General Electric Co., at Erie, Pa., with interesting data relative to the performance of these engines. It includes also a brief description of these locomotives.

The American Locomotive Co., recently completed five locomotives of the three-cylinder mikado type, for the South Manchurian Railway. Before the new engines were shipped abroad, they were tested in the novel manner recently introduced by the General Electric Co., and the American Locomotive Co., using an electric locomotive equipped with the regenerative braking feature as a means of registering the data of the performance. The tests were conducted on the test track of the General Electric Co., at Eire, Pa.

The electric locomotive used in the tests was one of ten units built by the General Electric Co., and the American Locomotive Co., for the Mexican Railway Co., Ltd., which at that time was ready for shipment. This locomotive was designed to operate from a 3,000-volts, direct-current trolley and was equipped with the regenerative braking feature for the purpose of holding back trains on the 4 per cent. grades between Mexico and Vera Cruz.

Because of the accuracy of electrical instruments, it was possible to determine the drawbar pull exerted by the steam engine much more accurately than by the use of mechanical measurements. In order to calculate the load for each run, recording and indicating instruments were used reading the total line current, speed and volt-

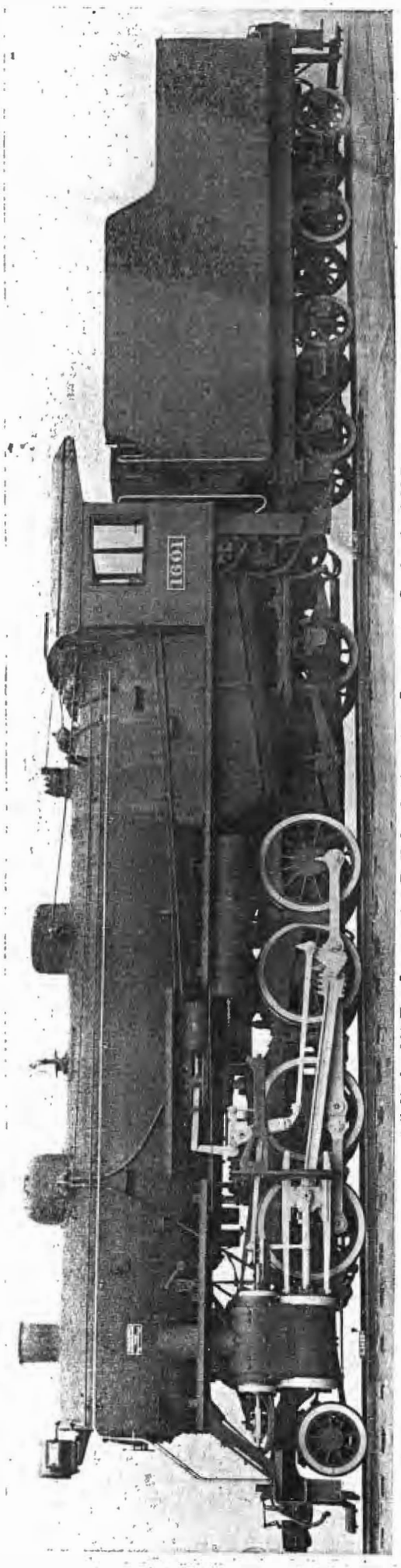


Boiler Pressure, 180: Speed, 5.45 M.P.H. Full Gear. Card, 1-5: I.H.P., 854.5

Boiler Pressure, 180: Speed, 14.76 M.P.H.: 50% cut-off: Card, 3a-4: I.H.P., 1583.9

Boiler Pressure, 178: Speed, 34 M.P.H.: 50% cut-off: Card, 9-1: I.H.P., 2284.3

Boiler Pressure, 179: Speed, 33.4 M. P. H., 33% cut-off: Card 11-2: I.H.P., 1794.

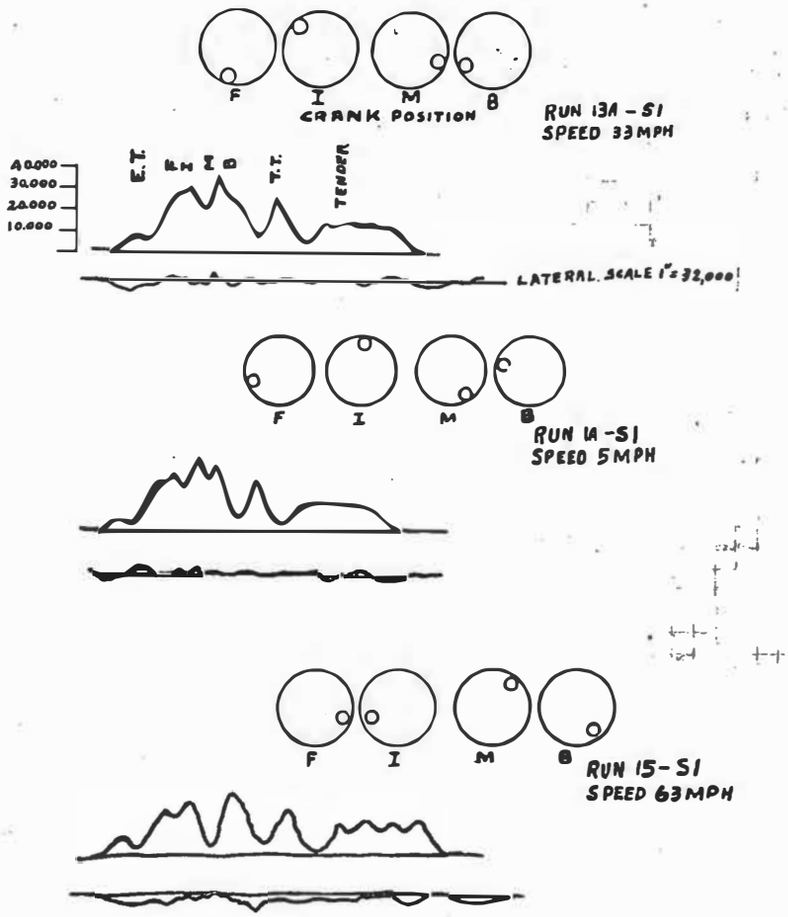


3-Cylinder 190-Ton Locomotive Built by the American Locomotive Co. for the S.M.R.

ages. Speed was indicated on the tachometer in the cab and was also checked by an electrical instrument recording wheel revolutions. From the characteristic curve of the motors it was possible to calculate accurately the electrical losses in the locomotive. The friction losses of the locomotive were obtained by experimental runs. Corrections were also made for grade and curvature.

An interesting check was made on the calculations by using one electric locomotive motoring and the other regenerating giving in effect a pump-back test in which the substation supplied the losses. A number of runs were made at between 5 and 28 miles per hour. By means of voltmeter and ammeter readings, the total output of the locomotive when regenerating was calculated, and making allowance for known losses and compensation for friction and curve losses, the actual drawbar pull was determined.

Although the engine was tested without the customary "breaking in," there was no indication of heated bearings at any time, even when the speed was forced up to 63 miles per hour, which is equivalent to a piston speed of 1,700 feet per minute. At this



Otheograms

speed there was no indication of rough riding in the cab and the records of the otheograph indicate remarkable lateral steadiness, or freedom from nosing, a maximum lateral thrust of 5,000-lbs. being observed. The accompanying otheograms illustrate the track reactions of 5 to 33 miles per hour, from which it may be noted that the lateral rail thrust at 33 m.p.h. is 3,000-lbs., indicating that the 5,000-lbs., obtained at 63 m.p.h. represents that the engines have great lateral steadiness at this speed.

The rapid acceleration of the engine as compared with the two-cylinder type was just as much in evidence in this engine as in the previous three-cylinder engines built, the full stroke cards showing admirable starting conditions.

A slight irregularity in the valve setting of all the cards will be noted, but it must be remembered that these cards were taken with the setting just as turned out from the shop, there being no opportunity to make the final adjustments before the tests. Even so, the specimen cards show very good equalization of power under the circumstances, and there seems little doubt but that this engine is the most remarkable locomotive of its size and general proportions that the American Locomotive Co., has built both as regards power and flexibility. It is unusual to find a locomotive primarily designed for freight service, with small wheels and long maximum cut-off, able to exceed the diameter-speed, yet this engine, with only 54-in. diameter wheels, easily attained a speed of 63 miles per hour with only about two miles in which to accelerate.

By reference to the accompanying tables and charts the results of the tests will be more fully understood. One of the tables gives the weights, dimensions and proportions of the three-cylinder engines. Another table contains data compiled from the indicator cards and from other recording mechanisms. Still another chart furnishes a comparison of the tractive effort of the three-cylinder engine with that of a two-cylinder locomotive having 25½-in. by 26 in cylinders and in addition shows the indicated horsepower as compared with the tractive effort, The other charts show otheograms and specimen indicator cards at various speeds.

As previously mentioned the new locomotives for the South Manchuria Railway are of the three-cylinder mikado (2-8-2) type. They operate on a track having a gauge of 4-ft. 8½-in. and use bituminous coal for fuel. The cylinder are 22½-in. by 26-in. and are arranged like those of locomotive No. 5,000. The three piston

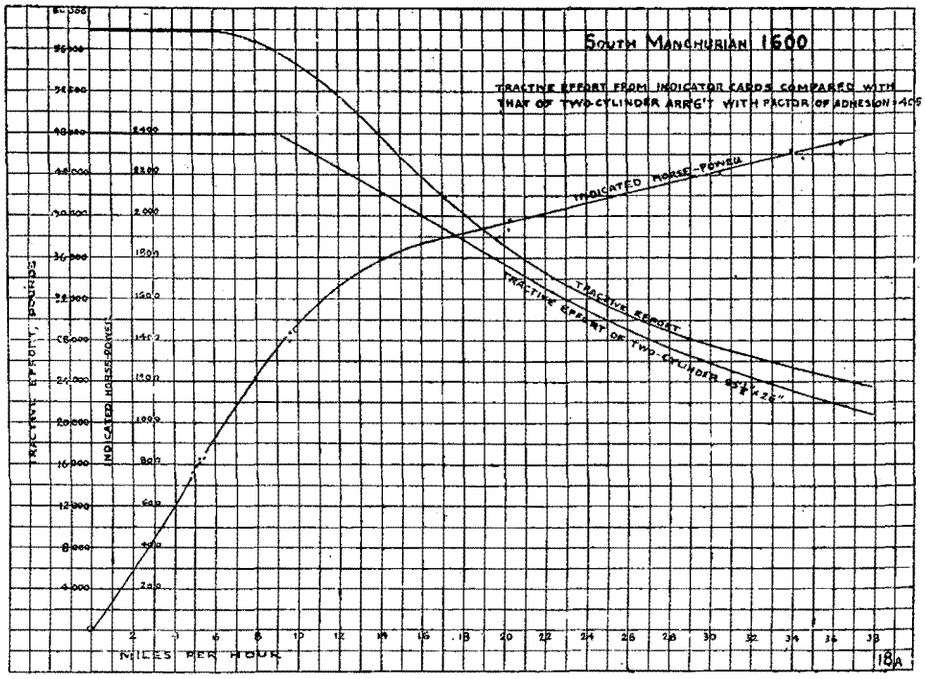


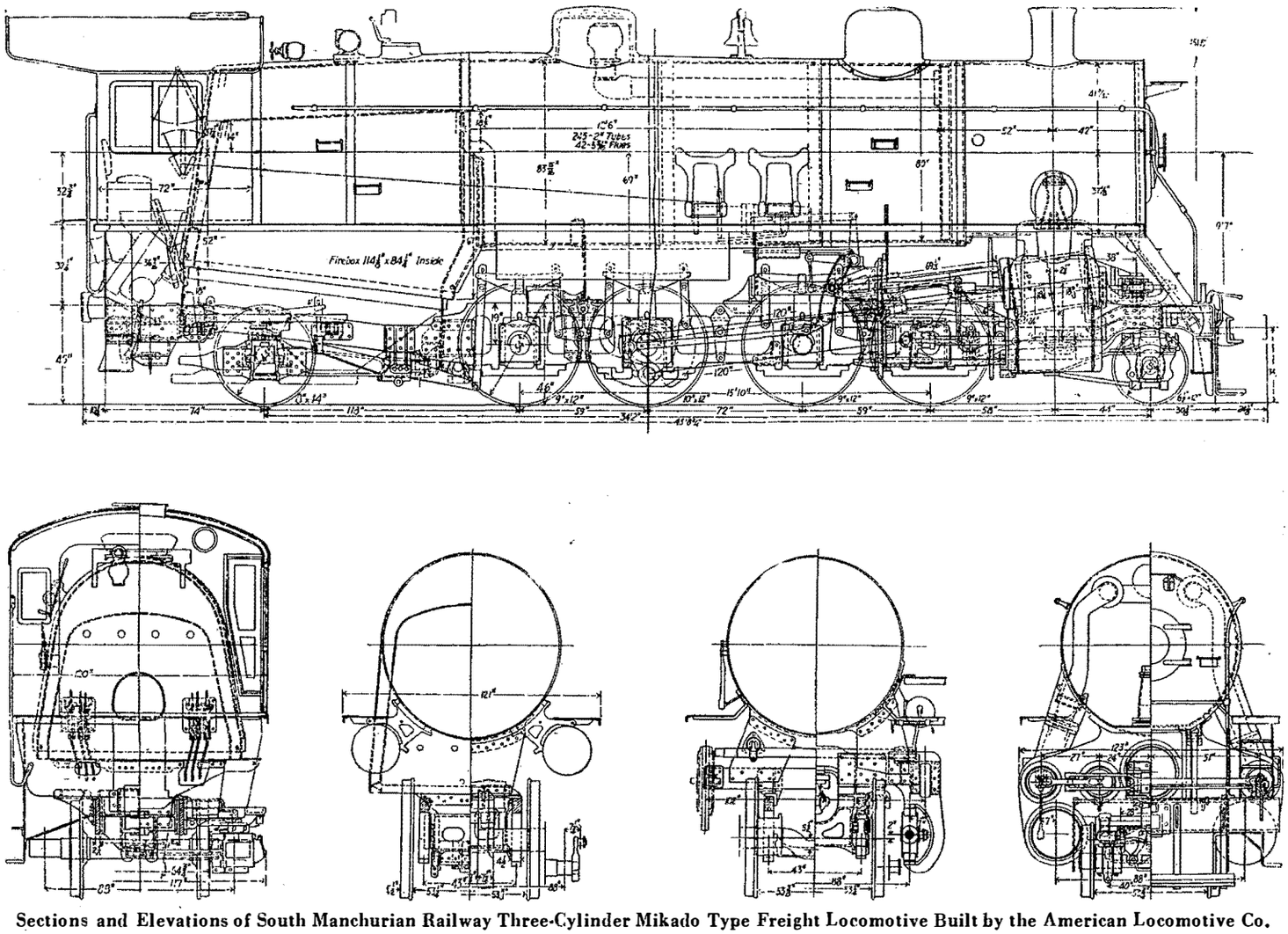
Chart Comparing Tractive Effort of South Manchuria Railway Three-Cylinder Locomotive with that of a Two-Cylinder Engine

valves are 12-in. in diameter with a maximum travel of 6-in., a lead in full gear of $\frac{3}{16}$-in., an outside lap of $1\frac{1}{8}$-in. and no exhaust clearance. The two outside valves are operated by Walschaert valve gear which through interconnecting levers also operate the third, or inside piston vale.

The engines weight 268,000-lbs. in working order, 25,000-lbs. being carried on the engine truck, 48,800-lbs., on the trailing truck and 194,200-lbs., on the driving wheels. The tenders weigh 135,-000-lbs., making the total weight of engine and tender 403,000-lbs. With a tractive effort of 56,000-lbs. the factor of adhesion is 3.47. The driving and the rigid wheel base is 15-ft. 10-in. and the total wheel base of the engine alone is 34-ft. 2-in., that of the engine and tender being 62-ft. $7\frac{1}{4}$-in.

The boilers are of the straight top type with wide radial stayed fireboxes. The diameter of the first ring is 80-in., and the steam pressure carried is 180-lbs. They are fitted with 245 2-in. tubes and a superheater having 45 $5\frac{3}{8}$-in. flues, the length of the tubes and flues being 18-ft. 6-in. and the spacing $\frac{3}{4}$-in. The fireboxes are $84\frac{1}{4}$-in. wide by $114\frac{1}{8}$-in. long, with a grate area of 66.8 sq. ft. They are fitted with sectional brick arches supported on arch tubes. The total heating surface of the boiler is 3,695 sq. ft., that of the tubes being 2,361 sq. ft., flues 1,088 sq. ft., firebox and arch tubes 246 sq. ft. and the superheating surface is 945 sq. ft.

The driving wheels are 54-in. outside diameter with 10-in. by 12-in. journals for the main wheels, the others being 9-in. by 12-in. The engine truck wheels are $33\frac{1}{4}$-in. in diameter with $6\frac{1}{2}$-in. by 12-in. journals, and the trailer truck wheels are 44-in. in diameter with 8-in. by 14-in. journals. The engine truck is of the Player type and the Cole-Scoville trailer truck is used. The main and side rods are of chrome vanadium steel and the driving boxes, engine truck and trailer truck wheel centers are of cast steel.



Sections and Elevations of South Manchurian Railway Three-Cylinder Mikado Type Freight Locomotive Built by the American Locomotive Co.

In addition to the above the engines are equipped with Viloco bell ringers, Viloco double sanders, Franklin power grate shaker, and Elvin mechanical stokers. They are also fitted with Franklin pneumatic fire doors, Franklin unit safety drawbars and radial buffers, Pyle National electric headlight equipment and the Chambers outside connected throttle valves. Some of the other equipment includes Okadee blow-off cocks, blower valves, tender hose couplings and water gauges, Also staybolts, Ever-lasting safety valves and Simplex injectors. The Ashcroft steam gauge is used with Nathan lubricators, Elvin grease cellars, Paxton Mitchell piston rod and valve stem packing, and the valves are operated by means of Alco power reverse gears. Gibson retaining rings are used and one engine is fitted with a Superior flue blower.

The tenders are of the eight-wheel type with arch bar trucks and rectangular water bottom cisterns having a capacity for 6,000 gallons of water and 12 tons of coal. The tender frames are built of steel channels, and the cabs are of the same design as those used in this country.

DIMENSIONS, WEIGHTS AND PROPORTIONS OF THREE-CYLINDER LOCOMOTIVES FOR SOUTH MANCHURIAN RAILWAY

Gauge	4-ft. 8½-in.
Service	Freight
Type	Mikado
Fuel	Bit. Coal
Cylinders, three, diam. and stroke	22½-in. by 26-in.
Valves, piston, diam	12-in.
Max. travel	6-in.
Lead in full gear	3/16-in.
Outside lap	1⅛-in.
Exhaust clearance	0
Weights:	
On drivers	194,200-lbs.
On engine truck	25,000-lbs.
On trailer truck	48,800-lbs.
Total engine	268,000-lbs.
Tender	135,000-lbs.
Total engine and tender	403,000-lbt.
Wheel base:	
Driving	15-ft. 10-in.
Rigid	15-ft. 10-in.
Engine	34-ft. 2-in.
Engine and tender	62-ft. 7¼-in.
Wheels, diam:	
Engine truck	54-in.
Driving	33¾-in.
Trailing truck	45-in.
Journals, diam. and length:	
Main	10-in. by 12-in.
Others	9-in. by 12-in.
Engine truck	6½-in. by 12-in.
Trailing truck	8-in. by 14-in.
Boiler:	
Type	Straight top
Pressure	180-lbs.
Diam. first ring	80-in.
Tubes, number and diam.	245 2-in.
Flues, number and diam.	42 5⅜-in.
Tubes and flues, length	18-ft. 6-in.
Spacing	¾-in.
Firebox:	
Length	114⅛-in.
Width	84¼-in.
Grate area	66.8 sq. ft.
Heating surface:	
Firebox	217 sq. ft.
Arch tubes	29 sq. ft.
Tubes	2,361 sq. ft.
Flues	1,088 sq. ft.
Total	3,695 sq. ft.
Superheating	945 sq. ft.
Tractive effort	56,000-lbs.
Factor of adhesion	3.47
Tender:	
Type	Eight wheel
Capacity coal	12 tons
Capacity water	6,000 gals.
Wheels, diam.	33¼-in.
Journals	5-in by 9-in.

An Useful Propeller Publication

Having regard to the number of enquiries which are constantly being received by the Editors of yachting, motor boating and other periodicals dealing with steam or motor craft, from owners who for one reason or another are dissatisfied with their propelling gear, it is extremely interesting to note that a most useful pamphlet has recently been prepared on the subject by John I. Thornycroft & Co., Limited.

This firm having had years of experience in the design and manufacture of propellers for all classes of service in various parts of the world, is in a position to offer advice of a distinctly reliable natnre. The booklet covers in a clear and concise manner the more common causes for dissatisfaction on the part of owners who, rightly or wrongly, have reason to think that they are not getting satisfactory results from their craft.

GREATER OSAKA

(Continued from page 14)

area alone will not make for a great city. There must be modern civic improvements carried out in order to make Greater Osaka worthy of its name.

Broader Streets

Side by side with the proposed plan of Greater Osaka, the city has a plan to construct broad streets which will run in four directions, in order to relieve the present congestion of traffic. The narrowness of the streets in Osaka, as in other cities in Japan, has been an obstruction to the proper development of modern enterprises in industry as well as in other lines of human activity. Moreover, if a natural accident, such as an earthquake which would shake the city from its foundations, should visit the city followed by a big fire (Osaka is famous for fires), the present condition of the streets is entirely unsatisfactory in affording the people sufficient right of way to escape to places of safety.

Already plans have been mapped ont by the city authorities for the construction of wide streets, which will be carried out as soon as the funds needed is secured. With the wealth and latent economic and financial strength of the city, there is no reason why the plans mapped out cannot be carried out, if the people address themselves seriously to the problem.

Rapid-Transit Means

There is also a plan of constructing rapid-transit means of travel in the city, either elevated or underground, in order to relieve the present street car congestion. The suburban electric car lines, such as the Hanshin, Hankyu, Nankai, Keihan and others in existence as well as those planned, are contemplating improving their service by reconstructing the lines in the city. Their plans have not progressed very fast as yet, due to legislative difficulties presented by the municipal assembly, but as soon as these and other natural impedimenta are overcome, means of locomotion to and from Osaka will be greatly improved.

The last, but not least, thing to be noted is the fact that the imperial railway office is now carrying out the plan of rebuilding Osaka station at Umeda into the finest railway station in the Orient. Acres of property adjoining the present station at Umeda have been purchased, the buildings standing thereon are being demolished, and engineering work is fast progressing. Within a few years Osaka's front gate will be decorated with a first class railway station worthy of the largest city in the Orient.—*Osaka Mainichi.*

Motive Power Development on the Peking-Suiyuan Railway

By J. K. Wong, Peking-Suiyuan Railway

THE Peking-Suiyuan railway was formerly known as the Peking-Kalgan, and it is not unlikely that its name will be again changed as the line is further extended. This line represents the first piece of work in railway construction carried out under exclusive Chinese engineering supervision. It was well done. The following tables, 1 and 2, show respectively the development of the main line and its branches for facilitating the promotion of local and mining industries:—

TABLE 1.

Sections.	Construction Commenced.	Completed.	Length in Miles.	Traffic Opened.
Peking-Kalgan...	... Oct. 1904	Sept. 1908	134.0	Sept. 1908
Kalgan-Fengchen	... Sept. 1908	Sept. 1915	135.0	Sept. 1915
Fengchen-Suiyuan	... Aug. 1919	April 1921	149.0	May 1921
Suiyuan-Paotow	... Jan. 1921	Dec. 1922	91.5	Dec. 1922

TABLE 2.

Sections.	Construction Commenced	Completed	Length in Miles	Traffic Opened
Peking-Mentoukou	... Mar. 1907	Sept. 1908	16.7	Sept. 1908 Coal
Round-Peking City	... June, 1915	Dec. 1915	9.5	Jan. 1916
Tatung-Kouchen, Shansi	April 1917	July, 1917	12.3	Sept. 1917 Coal
Shuanhwa-Shuimo	... Oct. 1917	Dec. 1917	5.4	Jan. 1918 Iron ores

Thirty-three miles from the Peking station is the Nankow-Pass, 12 miles long, which represents typical mountain construction work with sharp curves of 600 feet in radius, steep gradients of 1 in 30 and tunnels built on incline and with curvatures. The operation of traffic through this pass necessitates the use of powerful locomotives.

Mallet locomotives of the 0-6-6-0 type, with a maximum tractive power of 46,407 pounds, built by the North British Locomotive Company were put into operation on the pass in 1908 and the following year Shay geared engines with a maximum tractive power of 44,115 pounds, built by the Lima locomotive works were introduced. As traffic was fast increasing more Mallets built by the Baldwin locomotive works with 2-4-4-2 wheel arrangement and with a maximum tractive power of 27,400 pounds were purchased in 1911 for pushing passenger trains up grade.

As the line was further extended into the rich north-eastern plateau, hitherto isolated from other parts of the country for lack of transportation facilities, great cargoes of grain, wool, hides and coal found easy access to the world's market, resulting in a rapid increase of passenger and freight traffic which has continuously demanded larger motive power capacity for pushing heavier and longer trains over the mountain pass. In 1914, Mallets built by the American Locomotive Co., of the 2-8-8-2- type with a maximum tractive power of 54,375 pounds were purchased and in 1922 more Mallets also built by the American Locomotive Co., of the 2-8-8-2 type, but with a maximum tractive power of 92,500 pounds were added.

The last named represent the largest locomotives in operation on Chinese railways to-day. They were built by the American Locomotive Co., to meet the exacting requirements of the Peking-Suiyuan line and are equipped with modern appliances for economical operation and utilization of comparatively low grade of bituminous coal. These huge locomotives require such a great amount of steam to develop their full power that coal has to be burnt at a terrific rate which is considered hardly economical to be done by hand firing and, therefore, the Elvin underfeed mechanical stoker have been installed. For guiding the engine drivers to run these heavy engines at safe limitation of speeds upon the difficult track condition and strnctures at the mountain pass, automatic speed recording devices are employed. These engines are equipped with superheaters supplied by the Locomotive Superheater Company of New York and latest type of the American Westinghouse ET No. 6 air brakes suitable for operating on the automatic system as well as straight air. Figure 1 shows this type of Mallet engines and Figure 2 shows the lighter type. The particulars of the engines so far mentioned which operate on the mountain division, are shown in table 3.

Turning to the motive power for passenger and freight service, switching engines built by the American Locomotive Co., Baldwin Locomotive Works and a few from the Tongshan Locomotive Works with tractive power ranging from 11,454 pounds to 21,360 pounds were introduced, in the years 1906 to 1909. All these engines are of the tank type. Growth of traffic required more speed for passenger trains and in 1908 to 1909 Moguls were purchased; these engines develop a maximum tractive power of 22,093 pounds with 60" drivers. Switchers and Moguls mentioned above constituted the early source of motive power for the operation of the line which power was soon found to be inadequate to meet the growing volume of traffic. Therefore, modern engines with greater capacities have steadily taken the place of above, which until to-day are being used extensively for shunting in station yards and terminals only. Table 4 shows particulars of these engines.

In 1912, Consolidation type locomotives developing a maximum tractive power of 31,820 pounds were put into operation; in 1914,

TABLE 3.—MOUNTAIN LOCOMOTIVES.

Item No.	No. of Engines	Type of Engines.	Builders of Engines	Maximum Tractive Power	Weight in Work Order	Year of Adoption	Particulars
1	4	0-6-6-0	North British Loco. Co.	46,407-lbs.	216,000-lbs.	1908	Saturated steam. Air brakes.
2	6	Shay	Lima Loco. Wks.	44,115	176,000	1909	,, ,, ,, ,, Obsolete
3	4	2-4-4-2	Baldwin Loco. Works.	27,400	163,000	1911	,, ,, ,, ,, ,,
4	7	2-8-8-2	American Loco. Company	54,357	290,000	1914	Superheated steam. Air brakes.
5	7	2-8-8-2	American Loco. Company	92,500	446,000	1922	,, ,, ,, ,,

TABLE 4.—SWITCHING LOCOMOTIVES.

Item No.	No. of Engines	Type of Engines.	Builders of Engines	Maximum Tractive Power	Weight in Work Order	Year of Adoption	Particulars
1	4	Tank—2-6-2	Baldwin Loco. Works	11,454-lbs.	105,000-lbs.	1906-7	Saturated steam. Steam brakes.
2	3	,, 0-6-0	American Loco. Company	14,344	96,500	1909	,, ,, ,, ,,
3	2	,, 2-6-2	Baldwin Loco. Works	18,800	120,000	1909	,, ,, ,, ,,
4	2	,, 2-6-2	North British Loco. Company	11,900	83,000	1908	,, ,, ,, ,,
5	17	,, 2-6-2	Baldwin Loco. Works	21,360	111,000	4-1909 3-1920 10-1921	,, ,, Air. brakes
6	10	Mogul—2-6-0	Baldwin & Tongshan	22,093	123,000	6-1908 4-1909	,, ,, ,, ,,

AMERICAN LOCOMOTIVES ON THE PEKING-SUIYUAN RAILWAY

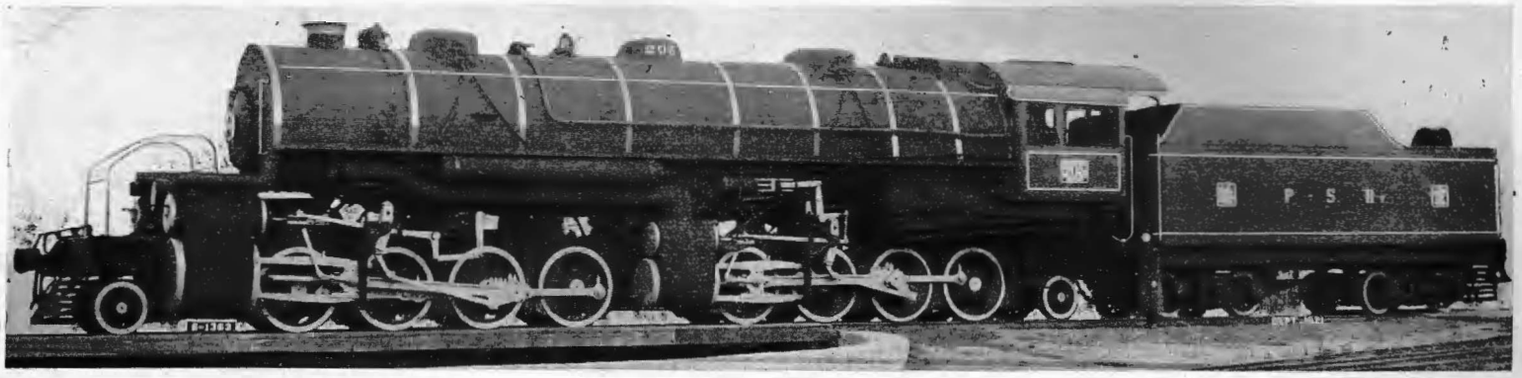


Fig. 1.—8-Wheeled Tender, Heavy Mallet Type

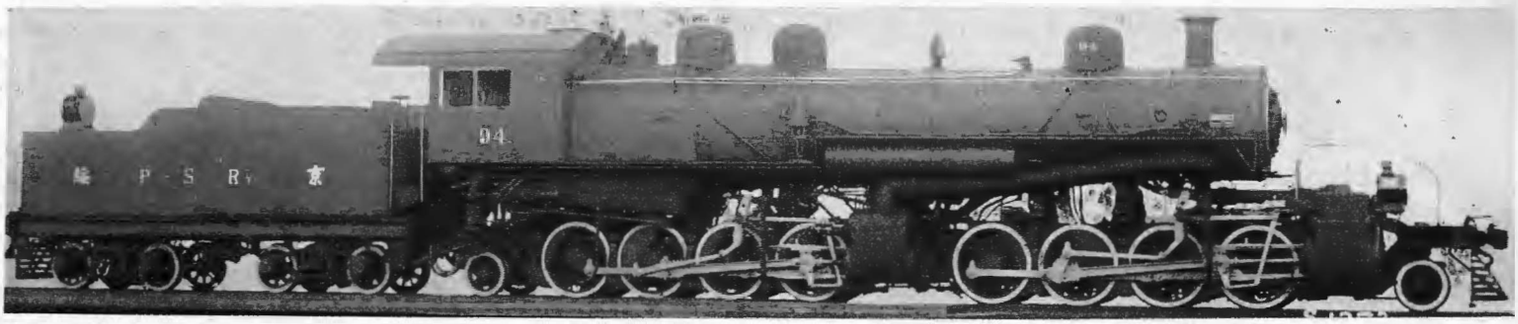


Fig. 2.—8-Wheeled Tender, Light Mallet Type

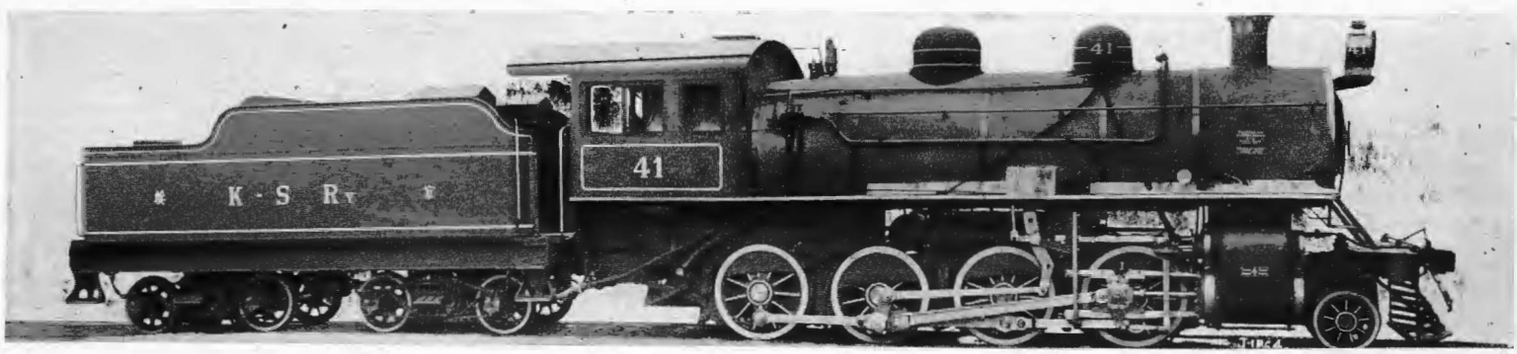


Fig. 3.—8-Wheeled Tender, Consolidation Type

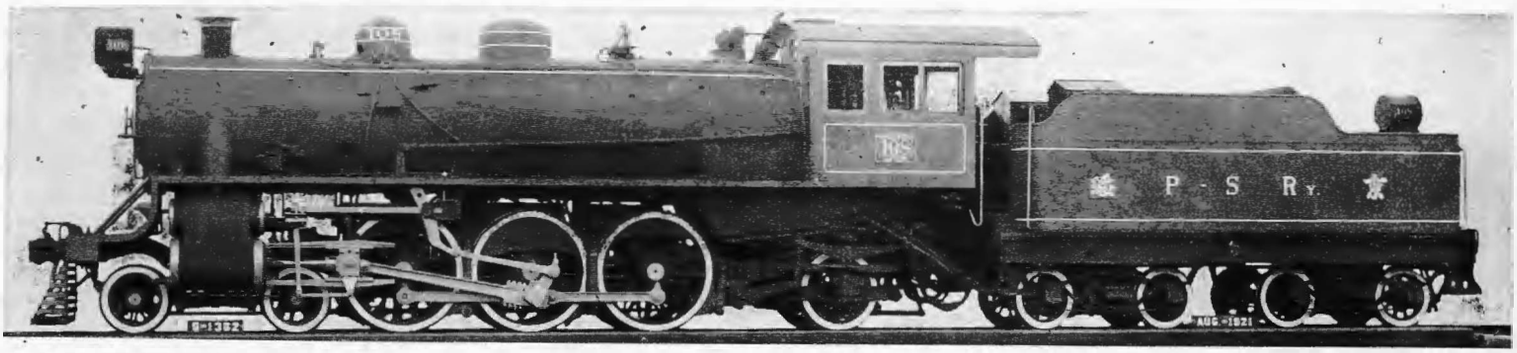


Fig. 4.—Pacific Type

Fig. 5.—Mikado Type

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

THE VOICE OF NEW JAPAN

DR. SCHURMAN'S SPEECH ON EXTRATERRITORIALITY

SAUCE FOR THE GANDER

THOSE UNEQUAL TREATIES

JAPAN'S PLAN FOR THE RECONSTRUCTION OF CHINA

RUSSO-JAPANESE TREATY

BARON OKURA

THE PIONEER OF SINO-JAPANESE COOPERATION

PENCHIHU

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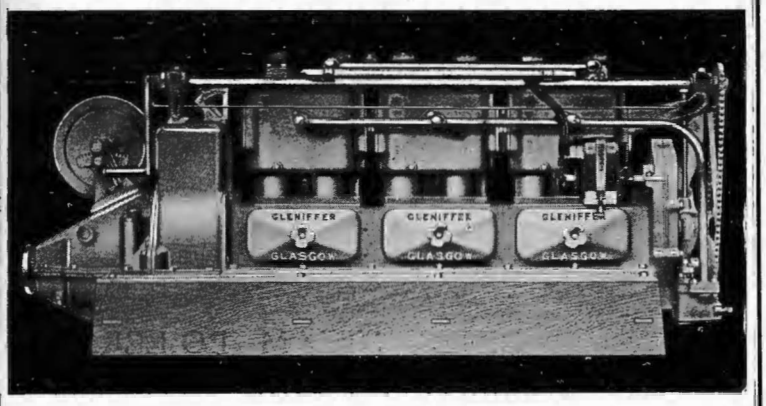

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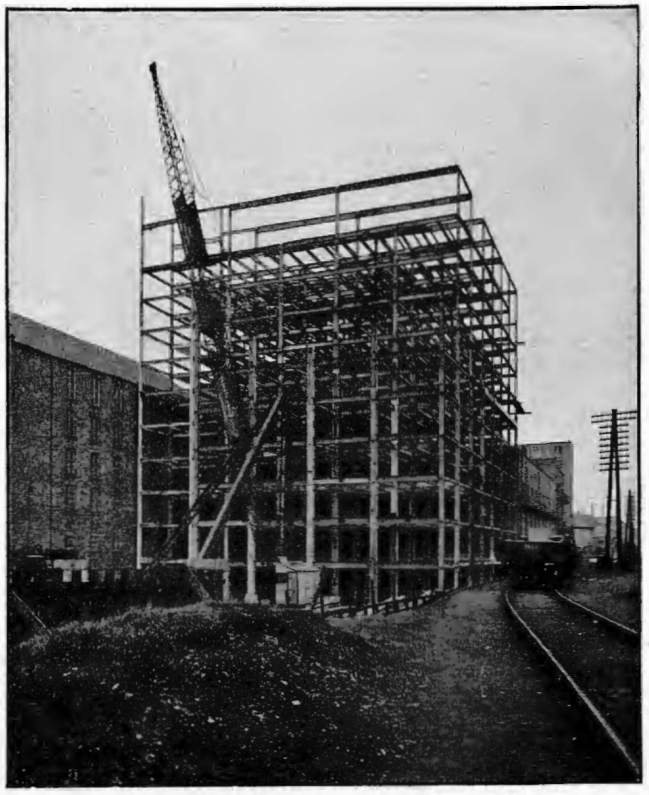

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and interests in Manchuria and Mongolia. In order to provide against any possibility of these rights and interests being ignored and unprotected as a result of the recent fighting around Shanhaikwan, we addressed an identic communication to the two warring parties on the thirteenth of last October, frankly calling their attention to our position in regard to the situation.

"It need hardly say that our concern is not confined to the condition of affairs in Manchuria and Mongolia alone. We are interested in the whole of China to an extent and in a degree absolutely essential to our national existence. But more particularly keen are our national sentiments over Manchuria and Mongolia, because of historic reasons in addition to those general considerations. I refer to the fact that Japan, in self-defence and in the interest of peace in the Far East, staked the country's fortunes on two great wars in the Manchurian plains. By such supreme efforts, we are now enabled actively to engage in peaceful undertakings in that region. I desire to repeat here once more what has been so often declared by the Japanese government, that we have no aggressive or territorial designs of any kind in in that or any other part of China.

"Secondly, we have followed with the strictest exactitude the principle of non-interference in China's internal politics. We have absolutely refrained from supplying any party in China with arms, munitions or loans that might be utilized for the purpose of continuing hostilities. Knowing that the Chinese people were sick of war, we believed that the refusal of assistance to any particular party in China was, in effect, assistance rendered to the whole nation of China. Another point to which we attached particular importance was our belief in international good faith. The Japanese government already subscribed some years ago to the resolution of the powers prohibiting supply of arms and ammunition to China. We further declared on more than one occasion our policy of non-interference in the domestic troubles of that country. We have now translated these commitments faithfully into fact.

"What has been the result of this attitude? I am happy to believe that the sense of justice and fairness with which we have met the situation is now widely appreciated not only by the Chinese people, but by all the powers of the world, with a consequent marked improvement in our relations with China and increased mutual confidence between us and the other powers.

"With the assumption of the office of provisional executive by Marshal Tuan Chi-jui, we have, on consultation with the powers, recognized his government as the 'de facto' government of China. We are not directly interested in the question, who will assume the reins of government in China, or what constitutional system may be adopted in that country. With a long historical background and amidst the surroundings peculiar to the country, the Chinese people must be left free to order their own national life in their own way. All that we consider important is that China should be provided with a sufficiently strong government to fulfil her international obligations in good faith and to maintain peace and order within her borders.

"Believing that the provisional government of China are seriously striving to attain these objects, we pray with deep sympathy for their success, and we are further prepared to render to China, in common with the other powers, such friendly assistance as may lie in our power. It should, however, be clearly understood that such sympathy and assistance are extended, not so much to any particular person or any particular party in China, as to the whole nation of China whose greater good we have always at heart.

"It is undoubtedly a tremendous undertaking to establish peace and unity in China. Although that work has not so far made such progress as might be desired, it must not be concluded that the Chinese people are not fully endowed with the gift of character needed for self-government. Such inference seems to us entirely unwarranted. In no case can we accept any plan based on these mistaken premises to place Chinese railways and other administrative organs under international control. We are satisfied that no such project is under contemplation by any foreign government.

"The reports that China may possibly become a communist state, or that she contemplates repudiation of all international commitments which she may deem prejudicial to herself, do not seem to us to be worthy of credence. We shall watch, with hope and tolerance, the efforts of the Chinese people to carry out political reforms so much needed for the country. While fully asserting our legitimate rights and interests in China, we shall give due and sympathetic consideration to the special conditions under which she is laboring, and we shall direct our best attention to the promotion of mutual understanding and co-operation—spiritual, cultural and economic—between the two nations."

There is no mistaking the import of the message conveyed in the above words. It tells the world that the Japan of ten years ago, the Japan of the militarists, the Japan of the twenty-one demands, discarded the mask as soon as its wearing was no longer compulsory. The downfall of imperial Russia terminated for Japan a twenty year nightmare in which at all times she was forced to maintain herself at a high pitch of military efficiency and to be prepared at any moment for the war of revenge that Count Witte frankly confesses was scheduled for 1912. Relieved of this menace and assured of peace in the Pacific by the terms of the four-power treaty, the real Japan reveals herself to the world.

Clear and to the point rings the message that new Japan sends to her fellow-Asiatics across the Yellow Sea. Japan challenges the imputation of inferiority conveyed in the oft-repeated statement that the Chinese people are not equal to the task of self-government and declares her intention to stand by them while they are passing through their hour of trial. With hope and tolerance, with deep sympathy and forbearance, Japan is watching their efforts to establish peace, unity and a stable government. And while they are ordering their national life in their own way, Japan gives them the assurance that no plan that may impair their administrative independence will be accepted or tolerated.

Baron Shidehara's address to the diet is a new declaration of Asiatic independence, one that will take its place in history by the side of the Hay doctrine, a further guarantee made necessary by present conditions, that China's territorial integrity and sovereignty will be respected, no matter what happens. New Japan has spoken.

G. B. R.

"Sauce for the Gander"

International Control of China's Railways

BARON Shidehara's perfect command of English enables him to express in the most restrained and correct diplomatic language, Japan's determination to oppose any plan having for its object international control over the Chinese railway system. Coming at this juncture when *The Times* and other organs of British opinion are strongly urging the application of this remedy to save the railways from complete ruin and guarantee to foreign bondholders the payment of defaulted interest and principal on outstanding loans, the pronouncement of Japan's foreign minister indicates how far the two nations have drifted away from each other on Asiatic policies since the alliance was dropped.

One of the main reasons urged by British sympathizers with China for dissolving the partnership with Japan was the allegation that under cover of its provisions Japan was protected in pushing forward aggressive designs upon China's sovereignty. In fact, the Chinese were encouraged by this reasoning to go still further and assert that *all* of their political woes and misfortunes were traceable to the terms of the alliance. It is well to recall this hysterical outburst when, three years after the disappearance of this

" root cause " of China's evils, Japan's foreign minister declares that no further impairment of China's administrative independence will be tolerated, with pointed reference to the plan for internationalization of her railways. This should provide food for serious thought to those important British interests which now find it necessary to devise some plan to save their investments in China from utter ruin.

The mistakes of the Anglo-American group in China have provided Japan with the opportunity to reinstate herself in the good-will of the Chinese and to stand as their champion, opposing any attempt to force through a program which extends foreign supervision over their principal revenue bureaus by bringing their railways under international control, which by reason of her investments, would hand their administration over to British experts. The mere fact that such a plan is even deemed worthy of discussion would indicate that the full significance of the new trend of Asiatic affairs has not yet been grasped. At a time when China is bent upon regaining her administrative independence through cancellation of unequal treaties, abolition of extraterritoriality and treaty port concessions and other infringements of sovereignty, in which she is openly supported by Russia, it is hopeless to expect that she will view with favor another plan which fastens foreign control for an indefinite period over her most important revenue-producing department.

Western exclusion laws have thrown Japan back upon Asia, giving birth to a fixed national program based on the most intimate relations with China. Co-operating loyally with the other powers in carrying out the provisions of the Washington treaties, Japan places her own vital interests above those of her partners and announces that henceforth she will assent to no plan, program or policy which jeopardizes her legitimate aspirations in China. In this stand she is fortified by her recognition of Russia and although for the present the treaty may convey no menace to other interests in Eastern Asia, it must be accepted as an effective check to an attempt on the part of any other combination to impose their policies upon China. The Anglo-American group four years ago counted Japan out of the race. She has come back in an unassailable position.

This is the answer of Japan to the long-drawn-out propaganda directed against her interests in China, a propaganda which did its utmost to discredit her in the eyes of the world, brought upon her trade a disastrous boycott, invalidated her loans to the Peking government, deprived her of a vital strategical railway right in Inner Mongolia and forced her to surrender Tsingtao together with the Shantung railway and mines. This campaign even went so far as to challenge her position in Manchuria, encouraging the Chinese to denounce the 1915 treaties which assures to Japan for 99 years her lease-hold of the Liaotung peninsula, the key to her economic and strategic security. Had this campaign succeeded in its entirety, Japan's huge investments in China would have been completely wiped out.

The advocates of exclusive Anglo-American co-operation in China have lost sight of the fundamental truth that a preferred position in a foreign country is invariably created through a preponderance of capital investments in the industries of that country. Including the South Manchuria railway, its subsidiaries and other industrial plants in China, the present investment values of these Japanese properties approximates Yen 5,000,000,000, a sum fifteen times greater than the cost of all Chinese railways built through foreign loans.

The bulk of the funds advanced for the construction of China's railways is nominally British but analysis of the loan flotations will reveal that including their equity of £13,520,000 in the Chinese Eastern railways, the French have invested a total of £28,595,000 in the railways of China. The British equity, including a £12,000,000 loan to the South Manchuria railway, stood at £26,620,000 in 1919, but the following year the responsibility for repaying the South Manchuria loan was taken over by the Japanese government, reducing the British equity in Chinese railways to £14,620,000. If the proportion of nominal British bonds subscribed in the Paris market at the time of the issuance of the loans be deduced from this, the British equity would be decreased probably 40 per cent. and the French equity increased proportionately. These figures are important in any discussion leading up to the imposition of foreign control over Chinese railways at this time. When spheres of interest and political preferment are eliminated from such discussions the wishes of the nation having the preponderating capital investment in the country must be given due and sympathetic consideration by other creditors.

On the part of the Japanese there is no hostility to any straightforward business plan that will protect foreign investments in Chinese railways, but there is a well-grounded fear that in return for China's consent to the reorganization of her railways under foreign management the Anglo-American group will encourage and assist the Chinese to regain control over the South Manchuria railway. They do not forget that British and American influence exerted a tremendous pressure to compel them to surrender their rights to the Taonan-Jehol railway and control over the Shantung line and with the new Soviet deal which restores to China joint administrative control over the Chinese Eastern railway, there remains only the Yunnan and South Manchuria lines under exclusive foreign ownership. The Japanese also vividly recall the official report of an American trade commissioner on China's railways in which they were accused of attempting to monopolize all her transportation lines and how Senator Brandagee demanded from the state department that the report be submitted to the senate during the fight in 1919 over the Paris peace treaty, in order to further inflame American public opinon against Japan.

Much water has flowed under the bridges since the signing of the consortium agreement and the Washington treaties. In the interests of peace and good-will, Japan sacrificed every advantage she had gained in China as the result of twenty years of watchful diplomacy and gladly accepted the doctrines which eliminated spheres of interest and guaranteed China's complete administrative independence. In doing so, she suffered heavy financial losses, but she has not whimpered or demanded the repayment of these loans at a time when the funds would tide over a great financial stringency.

Accepting that the British equity in China's railways is now in the neighborhood of £17,000,000 by including defaulted paymentt of interest and principal for the past five or six years, and thas in order to protect this investment, foreign supervision is now deemed essential; would those who advocate this plan be willing to extend the same concession to Japan and see her take over the supervision of some Chinese revenue bureau as a guarantee for the repayment of her loans ? Would they accept in the same spirit the imposition of Japanese direction over the Kiukiang-Nanchang railway, in default for many years on its obligations to Japanese investors ?

Let us remember that the Japanese took over the Shantung railway from Germany and in six years spent nearly as much as its original cost in improving it. Let us recall that Japan spent many millions in extending the port and city of Tsingtao, converting the fashionable watering place and naval station into an important manufacturing centre, creating work for the people and prosperity for the hinterland. Let us also not forget that Japan was willing to have the old German leasehold of Kiaochow and the port of Tsingtao converted into an international settlement, that she stood ready to internationalize the Shantung railway and mines by handing over their administration to the consortium. Let us remember that Anglo-American official and public opinion would accept no compromise short of full restoration of China's sovereignty over these properties and that Japan smilingly accepted the verdict which destroyed her investments, and got out. Let us recall the pleasing picture of a prosperous Tsingtao and Shantung when the port, railway and mines were administered by Japan and then look at their present condition . . . . and weep. The advocates of international control of China's railways three years ago rejected Japan's plan to safeguard her investments in Shantung. Would they be willing at this time to restore Japanese administrative control over the Shantung railway in exchange for Japan's consent to the internationalization of China's other railways ? Japan's surrender of her position and rights in Shantung are incorporated into a solemn treaty, which cannot be broken. When they find their own interests menaced with complete ruin, have the advocates of the present plan the courage to now propose that the Shantung railway be included in the lines to be brought under international control ?

Japan has sunk nearly Yen 50,000,000 in loans to the Han Yeh Ping Coal and Iron Company and there is little likelihood that the Chinese with their present system of management will ever repay the obligation. Instead of insisting upon taking over control of this premier Chinese industrial enterprise as a guarantee for the repayment of these loans, Japan is now sinking a further

Yen 9,000,000 in order to keep the steel works and mines alive. If conditions on the loan built railways of China are now so deplorable that foreign administration is imperative in order to save them from utter ruin, would those who favor this plan concede Japan's right to control China's iron and steel industry? In exchange for Japan's acquiescence in the international administration of China's railways would the advocates of this plan be willing to reciprocate and agree to Japanese direction over the Han Yah Ping coal, iron and steel enterprises and to purchase from this Sino-Japanese company the materials required for the reconstruction and equipment of China's railways during the period of foreign control? This would seem to be a very equitable arrangement if the proposition be considered from a strict business viewpoint. Japan now owns outright about 40 per cent. of all the spindlage of China's cotton mills. In addition she has made many loans to Chinese-owned mills in order to save them from going under. Would the advocates of international railway control view with sympathy the foreclosure by Japanese capitalists on the mortgages covering these Chinese cotton mills and other important industries and mines?

In any plan for bringing China's railways under foreign administrative control, what is the inducement held out to American interests to assent to such an arrangement? Would the United States government sacrifice its traditional policy in China in return for a few subordinate jobs in the direction of China's railways? Outside of the quarter participation in the Hukwang loan amounting to $7,500,000, and a few extra millions owing to American firms for materials supplied to Chinese railways, what motive could be urged in order to obtain America's consent to a plan which places their administration under experts from another country?

What will such an arrangement benefit Japan? What guarantee can the interested parties give to Japan that once an international commission is directing the state railways of China that a campaign will not be initiated for bringing the South Manchuria line under its control? It goes without saying that once China's railways are brought under the administration of an international commission dominated by Anglo-Americans that its thirst for power would grow as it became more strongly entrenched in authority. It does not require any undue political prescience to look ahead to the day when in order to consolidate its control over all railways in China such a commission would inspire an agitation to deprive Japan of the exclusive direction over the South Manchuria line by challenging the validity of the 1915 treaties. It worked in Shantung. The day may also arrive when Japan may be caught in a position where it would work in Manchuria.

The most successful and most efficiently operated railway in Eastern Asia is under Japanese direction. Its organization includes experts in every branch of railway operation. It employs a body of high-class technical experts for the creation and development of mining and industrial enterprises. They have accomplished wonders in Manchuria and if permitted could duplicate their work in other parts of China. If the proposed plan arises from an honest desire to protect the foreign bondholders, expedite the extension of her transportation system and develop her industries, what objection could there be to the South Manchuria railway authorities, acting as the trustee for these interests? Remembering that the Japanese hold a mortgage on the Shantung and the Kiangsi railways in China proper and on the Kirin-Changchun and Ssupingkai-Taonan lines in Manchuria, that their banks have advanced large sums to the ministry of communications, would the advocates of the plan be willing to accept Japanese leadership in carrying it out?

Anglo-American opposition to Japan's activities in China forced the creation of the new consortium, it brought about the Washington conference and the treaty that guarantees to China her administrative independence. Japan paid the price. She accepted the new line-up in world affairs and has lived loyally up to her committments. Conditions have since changed. Anglo-American business interests and investments in China are now being destroyed in the same manner that Japan's investments were formerly imperilled. America and Great Britain fixed the rules of the game at Washington. They posed as the saviors of China receiving due praise and gratitude from the Chinese people for establishing their status amongst the nations. Baron Shidehara diplomatically declares that the pledges made at Washington must be fulfilled. Japan assumes the rôle of China's champion and says in so many words, "What is sauce for the goose is sauce for the gander."

Those Unequal Treaties

Japan Rejects the Idea that China will Repudiate Her Treaties: A Guarantee that Her New Understanding with Russia Does not Clash with Her Washington Committments

DIPLOMATIC speechmaking as a means of giving publicity to a nation's foreign policy is rapidly superceding more formal announcements through regularly constituted official channels. The clear, concise and commendable outline of Japan's program in China announced in Baron Shidehara's speech before the diet followed Minister Schurman's equally forceful presentation of American government's attitude on the abolition of extra-territoriality, acknowledging the right of China to cancel the so-called unequal treaties just as soon as China has established a unified government capable of discharging its obligations.

The message of Minister Schurman provides the opportunity for Mr. Karakhan, the Soviet ambassador to Peking, to take up the discussion where Baron Shidehara and Dr. Schurman left off. In a speech delivered before the Peking National University on January 21, he takes direct issue with the American program of evolution and asks:

"But what does this term really imply? To repudiate unequal treaties by an evolutionary method means to put one's self at the mercy of those who forced such treaties upon China, it spells waiting, asking, entreating and after all, leaving the cancellation of the treaties, in the hands of those who do not wish to cancel them" . . . America's promise to cancel unequal treaties after the establishment of a strong Chinese government is nothing else than a polite way of refusing to give them up. You may write this down in exactly this sense."

Like all Soviet leaders, Mr. Karakhan has the word "revolution" on the brain spoiling an otherwise enlightening contribution to Far Eastern politics by declaring that the annulment of the unequal treaties can come only through this method.

What would be the consequences to China if the so-called unequal treaties are cancelled without previous arrangement with the other powers? What nation would dispatch its armed forces to China to uphold and maintain their treaty rights? Would it be possible to stir up American opinion and congress to the point where they would agree to send an expeditionary force to China for the purpose of defending our extraterritorial rights? Will Japan modify her new policy towards China by joining in such a movement? Would Great Britain standing alone, or with France, enter into an adventure of such magnitude without the co-operation of America and Japan? On the other hand we see Russia standing behind China urging her to take the leap, citing the ease with which Afghanistan established her independence and the victory of Turkey over European imperialism.

"Their example will," he hopes, "lead to the national emancipation of the Chinese people, which knows that far from being the product only of the last years, our policy was formulated in an absolutely precise manner as early as 1919. We feel certain," he adds, "that our policy is uniting with ever stronger bonds the people of the U.S.S.R. and China, mutually strengthening our international position. And I think that not the least role in the struggle which you will carry on with stubbornness and self-devotion until you

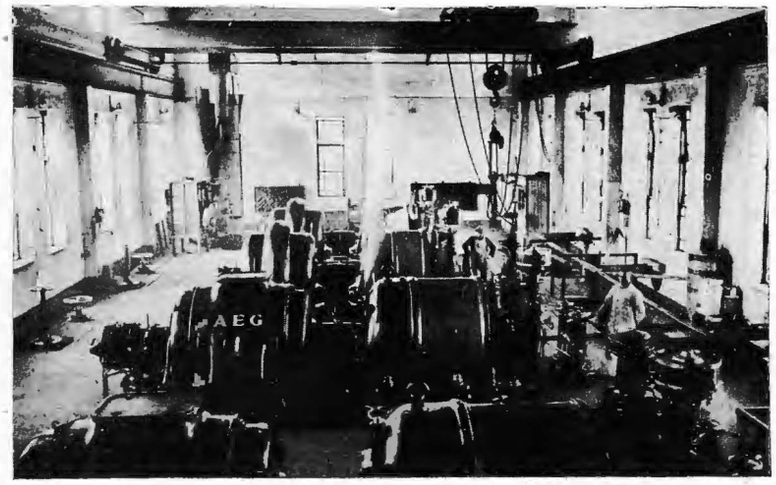
Panoramic View of the Penchihu Blast

PENCHIHU

A Sino-Japanese Co-operative Enterprise in Manchuria Organized and Developed by Baron K. Okura

FOR centuries before they were welded into a nation, the Manchu tribes burrowed into the hills of Miaoehrkau for the ore which supplied them with iron for their arms, implements and utensils, smelting it with the coal and limestone dug from the outcrops at Penchihu, six miles distant. It is on record that sometime during the reign of the Emperor Chien-Lung an imperial decree was issued conceding to the people of that region the right to operate the Penchihu workings on the payment of a stipulated royalty to the imperial treasury. Coke burned from Penchihu coal and iron ore brought from Miaoehrkau formed the basis of a crude industry whose product found a ready market throughout the Three Eastern Provinces and Korea. For a long period the Penchihu district prospered in its enjoyment of a quasi-monopoly in the supply of iron to Manchuria and North China and it was not until the latter part of the last century that circumstances arose compelling a departure from the ancient methods of mining and smelting.

At this time, the main shaft of the Penchihu coal workings became flooded to an extent that the old hand power pumps and antiquated methods of raising water could no longer cope with the inflow. On top of this disaster, large quantities of foreign iron and iron ware were imported into China at prices prohibiting native competition. The Hunghutzes put the finishing touches to the tale of woe by raiding the town and driving away the inhabitants. Then came the Russians exploring the region followed by the Russo-Japanese war bringing the district within the zone of active military operations and terminating an industry which its crude way had provided the province with coal and iron for many centuries.



Turbo-Blowing Engines for Blast Furnaces at Penchihu

The real story of Penchihu dates from this time. Baron K. Okura, head of the house which bears his name, and one of the most successful contractors to the Japanese army, was with the forces in Manchuria and grasped the great possibilities for an iron and steel industry presented by the close proximity of a high grade ore to excellent coking coal and limestone deposits. Okura did not wait for the termination of the

Furnaces and Principal Coal Workings

war to push forward his plans but applied at once to the Japanese military authorities at Liaoyang for the mining rights to these properties. Permission to commence operations was granted the following month (November 1905), and active work started in January, 1906.

The Chinese authorities, however, were closely watching the Japanese activities and as soon as the war terminated, entered a formal protest against the validity of a concession granted by the Japanese military authorities. They realized, however, the hopelessness of completely ousting the Japanese and proposed to place the coal mine under joint Sino-Japanese ownership. After three years of negotiation between Baron Okura and Viceroy Hsi Liang, a deal was effected which brought the coal properties under the Penchihu Colliery Company, organized in January 1911 with a capital of $2,000,000 half Chinese and half Japanese. The agreement, however, covered only the coal mining rights at Penchihu. Baron Okura had set his heart on establishing the larger enterprise and suggested to the Chinese that the iron mines at Miaoehrkau should also be brought under control of the company. On October 6, 1911, a new agreement was, therefore, entered into for the acquisition of the iron deposits and the erection of a blast furnace at Penchihu and the name of the company changed to The Penchihu Coal and Iron Mining Company. The capital was increased to $4,000,000, shared equally by Chinese and Japanese. In March, 1913, this was again increased to $7,000,000, where it now stands. The success attending this initial co-operative Sino-Japanese undertaking paved the way for many other similar enterprises which have brought prosperity to the Chinese in Manchuria.

Location of Mines

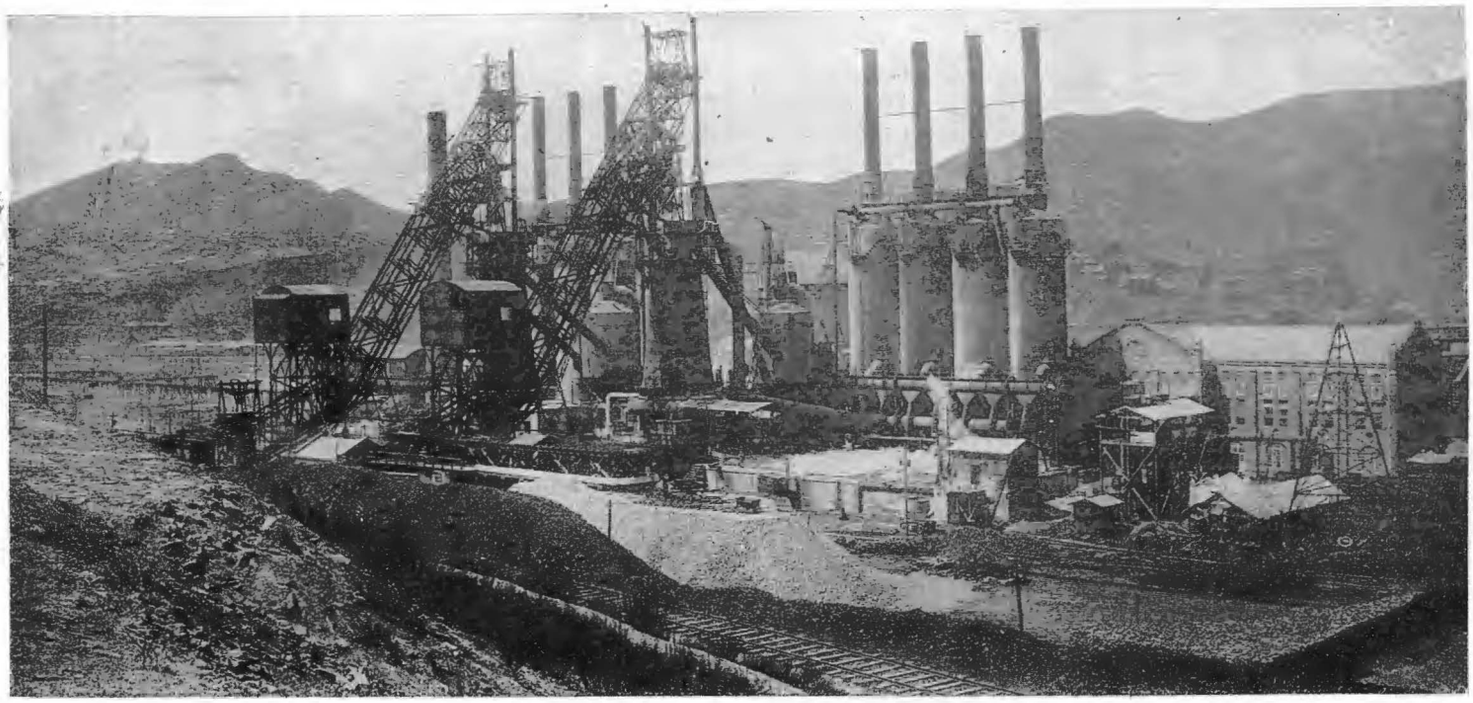
The coal mine and blast furnaces of the company are located in what is known as the Fen-chi district of Fengtien province, 47 miles east of Mukden on the Mukden-Antung division of the South Manchuria railway. Its commercial position is somewhat unfavorable, inasmuch as it is difficult for its product to compete with the superior advantages of location enjoyed by the Fushun mines of the South Manchuria railway. This was one of the compelling reasons which decided the Chinese government to give its consent to expand the original coal concession into an iron and steel enterprise. The mines being 283 miles from Dairen and 147 from Newchwang, its products are shipped to the latter port except when the Liao River is frozen over in winter and closed to navigation.

Penchihu Coal Field

The Penchihu coal field extending over an area of 9,444 acres, embraces 17 veins of varying thickness aggregating 550-ft., of which the following are being worked: the Paocha vein, 7-ft. thick, Hsiangtuan vein, 4½-ft., Choucha vein, 3½-ft., Ihsiching 5½-ft., Erhhsiching, 9-ft., Shanhiching, 3½-ft. and Wuhsiching, 4-ft., total thickness, 40-ft. The veins outcrop 900-ft. above the level of the Taitse River with a dip of about 15 degrees in the upper stratas and nearly 30 degrees in other places.

The first pit for mining the three upper veins, was sunk in April 1906, coal being struck at a depth of about 600-ft. Three inclined shafts were driven at the same time for haulage, drainage and ventilation. No. 2 pit, 12-ft. in diameter, was started in October, 1907 and sunk to a depth of 310-ft. This pit is lined with brick and serves for pumping and ventilating all the other pits and inclines. No. 3 pit was started in 1908. Originally, the Paocha and other veins were worked on the combined pillar and stall system but after various trials, sand-flushing was adopted for all the workings.

Hoisting and winding engines are used on the inclines for hauling out the coal cars and electric locos on the levels. Twenty-five pound rails are used on the inclines and twelve pound on the levels. For conveying the coal between the levels and the working places troughs made of steel plate are used in pit 1, which has a gradient of 30 degrees. In pits 2 and 3 where the gradient is only 18 degrees, baskets and sleds are used. Roller bearing steel coal

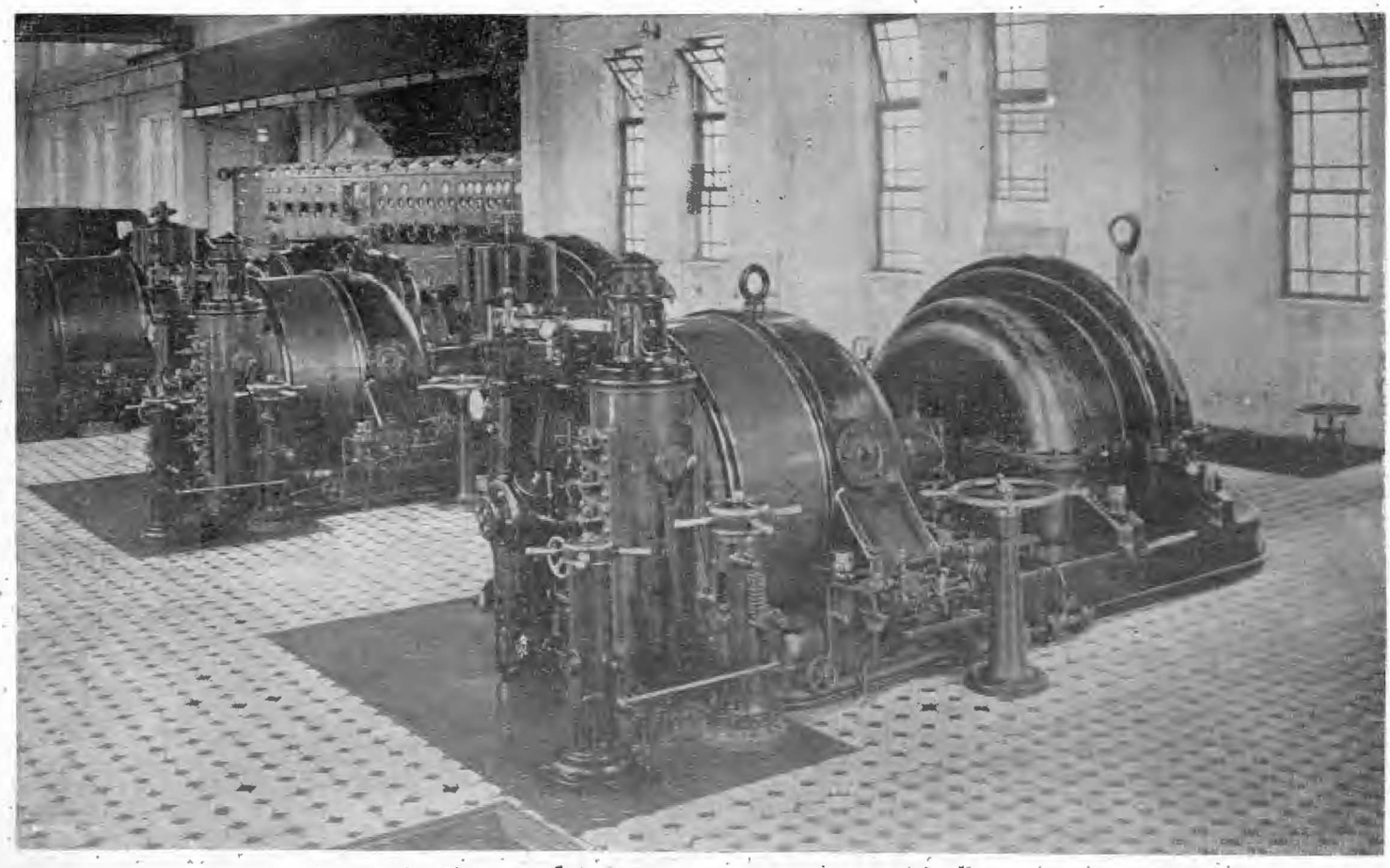


General View of the Penchihu Blast Furnaces

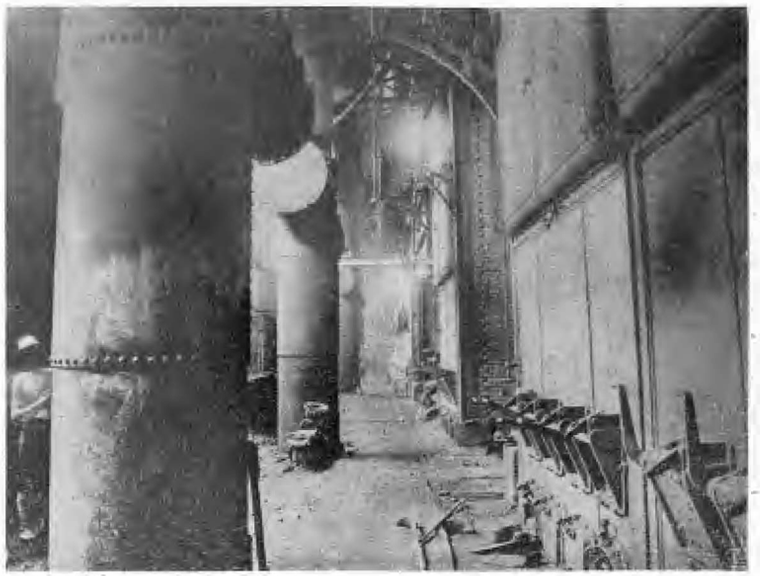
cars with a capacity of 25 cubic feet or 6 tons are used to bring out the coal.

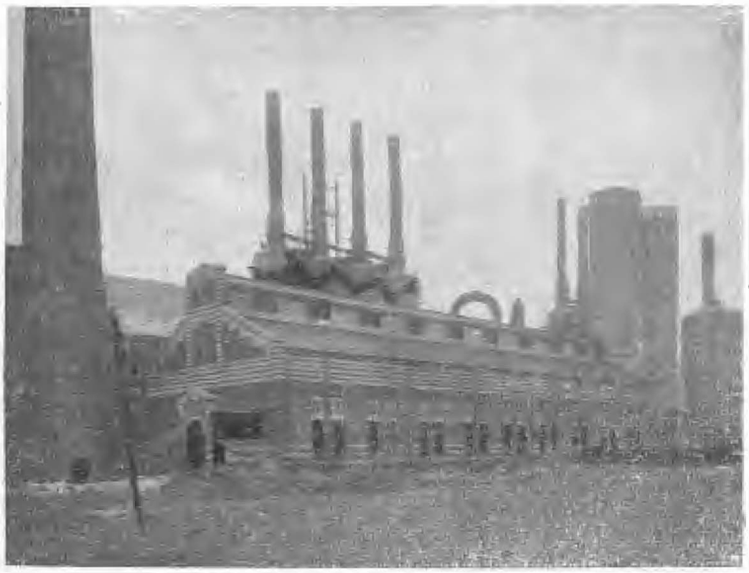
Pit No. 1 was originally operated by a cross-compound winding engine, which was a converted to a motor driven type with a cable speed of 120-ft. per minute. In pits 2 and 3 a motor driven double drum winding machine with a speed of 150-ft. per minute is employed, the coal being carried to the screening plant by means of an endless cable. One motor-driven Capell fan of 140,000 cubic feet per minute installed at the mouth of pit 2 supplies ventilation to all the pits which are connected together in the lower levels. Interior ventilation is also produced by a number of fans of 1,000 cubic feet per minute installed at each pit. Motor-driven turbine pumps keep the workings dry. Clanny lamps are used by the miners and Davy lamps by the officials. Electric current is supplied to all the pits for power and lighting. The miners work in two shifts, one from 5 a.m. to 5 p.m. the other carrying on during the night.

The present output of the mines is from 2,800 to 3,000 tons of coal per day. No. 1 pit employing about 600 coolies is giving from 700 to 900 tons per day, No. 2 pit with the same number of workers from 600 to 700 tons and No. 3 pit from 400 to 500 tons per day. In pits 1 and 3, three veins are being worked and in pit 2 five veins; a total of eight veins having a total thickness of 40 to 45-ft.



Power House of the Penchihu Coal and Iron Works

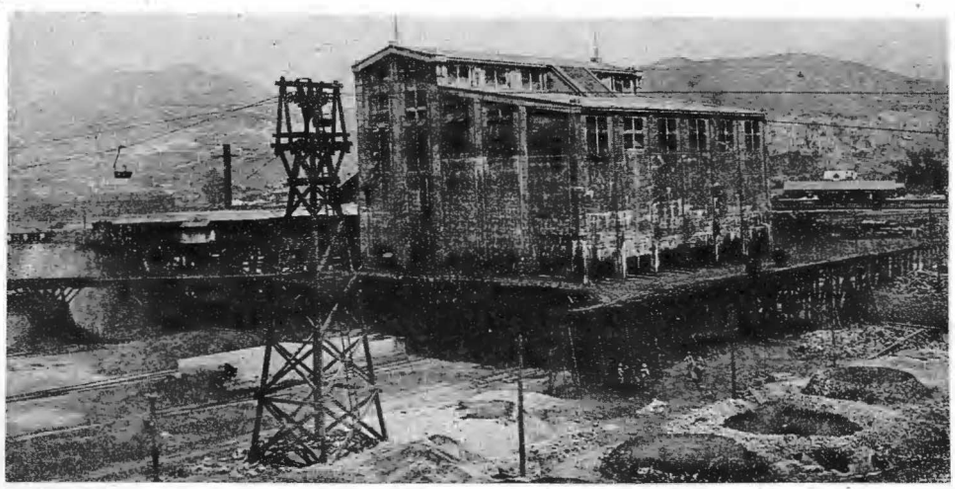




Exterior and Interior View of Boiler House at Penchihu

Electric Power Plant

Power for the various uses of the mine is generated at the company's plant attached to the works. It also supplies light for the towns of Penchihu, Kiaotao and Nanfen. The plant is equipped with one G.E., 2,500 k.w. and two A.E.G. 1,500 k.w. turbo-alternating sets. There are also two 840 h.p. A.E.G. and one 1,200 h.p. Escher-Wyss turbo-blower sets for the blast furnaces, three smaller direct current generators of Japanese make and two A.E.G. motors for driving the pit winding engines. The steam generating plant, using coal or blast furnace gas as required, has six Borsig boilers with a total of 4,300 square feet of heating surface and three B. & W. boilers with a total of 4,396 sq. feet of heating surface, working at 175 lbs, pressure superheated to 200 degrees.



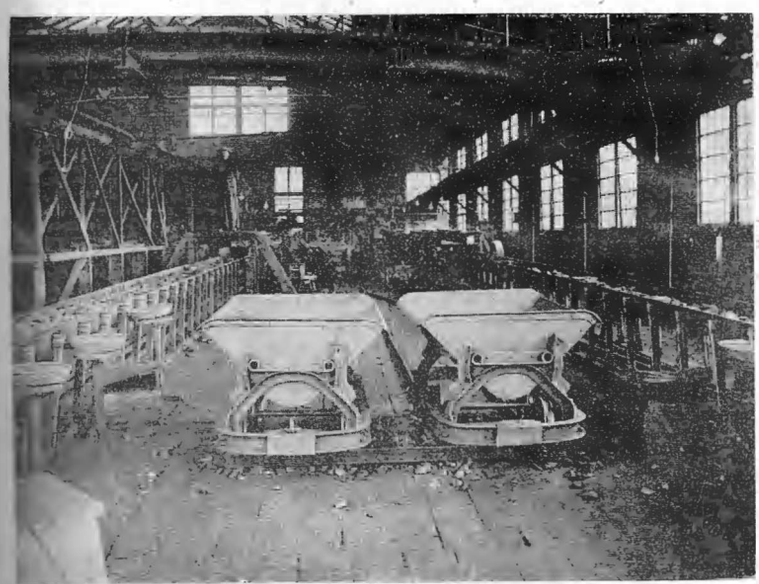
Coal Washing and Screening Plant at Penchihu

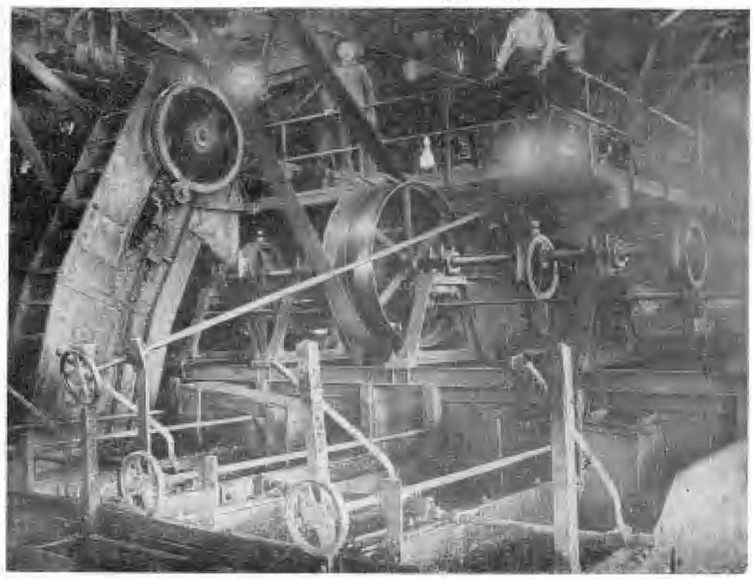
Blast Furnaces

The two blast furnaces are of 130 tons capacity each. The first furnace, blown in on June 13, 1915, was purchased in England and Germany, while the second was made at the Shakako Works of the South Manchuria railway at Dairen. These furnaces are 88-ft. high, 11-ft. 1½-ins.in diamater at the furnace mouth and 9-ft. 10-ins. hearth diameter. The charging tower, worked on the Panlich system, is 164-ft. high.

The furnaces used to heat the blast are of triple McClure type each 20-ft.. in diameter and 90-ft. high being surmounted by a 70-ft. stack. The intake for air is at the top and the waste heat of the blast furnace gases raises the air current to a high temperature before it is admitted to the tuyères above the blast furnace bearth. The blowers operate at 2,500 revolutions a minute and furnish 720

(*Continued on page 89*)





Interior of Coal Washing and Screening Plant

A Pioneer of Sino-Japanese Co-operation

(*Continued from page 59*).

modern Asiatic masters. The collection includes carvings, pictures and porcelains of marked antiquity, amongst which is a group of Buddhas considered as one of the national treasures of Japan. This is the famous Okura Fine Arts Museum, in the perfection of which its founder not only lavished his wealth but found that same relaxation from business cares and stimulant to his energies as did J. P. Morgan in his search for the beautiful in the art galleries of Europe.

In 1898, he established at a cost of a half million yen the Okura higher commercial school, in Tokyo, from which many students have graduated and made their mark in the business and industrial world of Japan. Another million was donated in 1907 to establish similar institutions in Osaka and in Seoul. He has contributed freely to succur the sufferers from flood and famine in Japan and China and last year donated a million yen to the emperor's relief fund for the earthquake victims.

The attitude of the house of Okura towards labor is best expressed by Mr. C Kadono, vice-president and active head of the Okura interests, in an interview recently published in *The Japan Advertiser*. At a time when it is generally admitted that Japanese laborers and skilled workmen are paid entirely out of proportion to their efficiency and earning power and a general tendency to economize by reducing wages is seen on all sides, the active head of the vast Okura interests takes the saner and broader stand that labor should be encouraged to greater efficiency and increased production by shorter hours and better wages.

The proper relation between capital and labor constitutes the most vital problem confronting the captains of industry in America and Europe and has been partially solved by increasing the efficiency of labor through a betterment of its economic and social status. The same problems will have to be faced as Japan becomes more highly industrialized, and their solution will also depend largely upon the measures taken by capitalists to better the general condition of her working classes. Mr. Kadono sounds the right note. The road to real prosperity and world recognition of Japan's right to equality lies in this direction.

The life of Kihachiro Okura is a romance of money-making as interesting and as worthy of high commendation as those of many better known American and European millionaires. Born in 1836 in Echigo, he came to Tokyo at the age of eighteen to seek his fortune, starting at the bottom of the ladder as an employee in a drug store. Five years later, he opened business on his own account. The wars of the restoration gave to Baron Okura his real start on the road to fortune through the importation and sale of arms to the clansmen, his business bringing him into intimate relations with the statesmen of the early Meiji period and earning for him a commanding position in the commercial world. In 1872, when Prince Ito made the first tour of foreign countries in order to investigate foreign methods and apply them to Japan, Kihachiro Okura, formed part of his large suite, the first Japanese business-man to make the tour of the world. On his return in 1874 he organized the Okura-gumi, the pioneer foreign trading company in Japan, its branch office opened in London during the same year being the first branch of a Japanese concern in a foreign country. From this beginning the activities of the Okura-gumi have expanded until now they cover nearly every line of commerce and industry with offices in all the principal cities of Japan and branches throughout China as well as in Vladivostok, Sydney, San Francisco and New York.

The civil war of 1894, the Sino-Japanese and the greater Russo-Japanese conflict found the Okura-gumi fully equipped and organized to act as the leading government contractors for the supply of arms, munitions and supplies to the military forces. The provisioning of Japan's army and navy had since constituted one of the most interesting branches of the wide-spread Okura activities, leading the firm to engage heavily in the China and Mongolia cattle trade and to acquire cold storage plants in Tsingtao, Tientsin and Manchuria. In the struggle for existence which confronts Japan, the need for beef, mutton and other meat foods is increasing rapidly from year to year and the one dependable source of near-by supply lies in Chinese territory, in the province of Shantung and the plains of Mongolia. The foundation laid by the Okura-gumi as army contractors has given the firm an exceptional advantage to utilize its organization for this purpose.

Outside of the companiee which bear his name, the Okura holdings are so wide and varied that it would be difficult to enumerate them all. Sufficient to say that Baron Okura is deeply interested in the Bank of Taiwan, the Hokkaido Colonial Bank, the South Manchuria Railway, the Tokai Paper Mill, Otaru Timber Co., Japan Leather Company, Japan Chemical Industrial Co., Imperial Hotel, Imperial Theatre, Imperial Flax Co., Tokyo Rope Mfg. Co., Japan Shoe Mfg. Co., Japan Beer Brewery Co., Japan Sugar Co., Tokyo Electric Light Co., Industrial Bank of Japan, Ujigawa Hydro-Electric Co., Nlitaka Sugar Refining Co., Railway Car Mfg. Co., Tokaichi Development Co., Imperial Refrigerator Co., Tokyo Wool Factory, Akita Timber Co. and many others.

In China, he has built up the Penchihu Coal & Iron Mining Co., and is one of the largest shareholders in the Han Yeh Ping Iron and Steel Corporation. The engineering world, however, will always associate the name of Okura with the introduction of modern machinery and industrial methods into Japan. This branch of the Okura business was established in 1891 and in addition to acting as the agents and representatives of many of the best foreign manufacturers of machinery, the engineering department entered into the general contracting field undertaking all branches of public works, buildings, bridges, railway and harbor construction and reclamation work.

Early in life Baron Okura recognized the vital importance to Japan of the closest political and commercial relations with China and many of his years and a great part of his fortune has been spent in developing this intimate contact through the investment of Japanese money in Chinese concessions and in the establishment of joint industrial undertakings. He has always played fair with his Chinese associates and as a consequence enjoys their respect and confidence to a degree greater perhaps than any Occidental or other Japanese. A large part of his energy has been expended in developing the various resources of Manchuria and Mongolia.

Although these investments have not always proved profitable and the successful operation of various enterprises has been hampered by Chinese ignorance, hostility and official interference, Baron Okura remains firm in his belief that it is in this region that Sino-Japanese business co-operation will bring the greatest and most lasting benefits to both countries. The prosperity that has come to Manchuria, filling the pockets and swelling the bank accounts of Chinese of all classes, is due primarily to the operation of the South Manchuria Railway but the many independent Japanese enterprises in that region have also played a large part in creating these riches. Foremost amongst the latter has been the firm directed by the optimistic Baron whose faith in the country has brought many millions into it on which the Chinese alone have so far drawn down dividends.

His Chinese friends with their profound veneration for age and characteristic lavishness in making presents to those they respect, deluged the Baron with such costly gifts on the occasion of his recent birthday that many had to be returned to their senders because of the prohibitive luxury tax now in force in Japan. It was largely to reciprocate this expression of good-fellowship and entertain his Chinese friends in a proper manner that he planned the gala fêtes that met with such opposition from the Radicals of his own country.

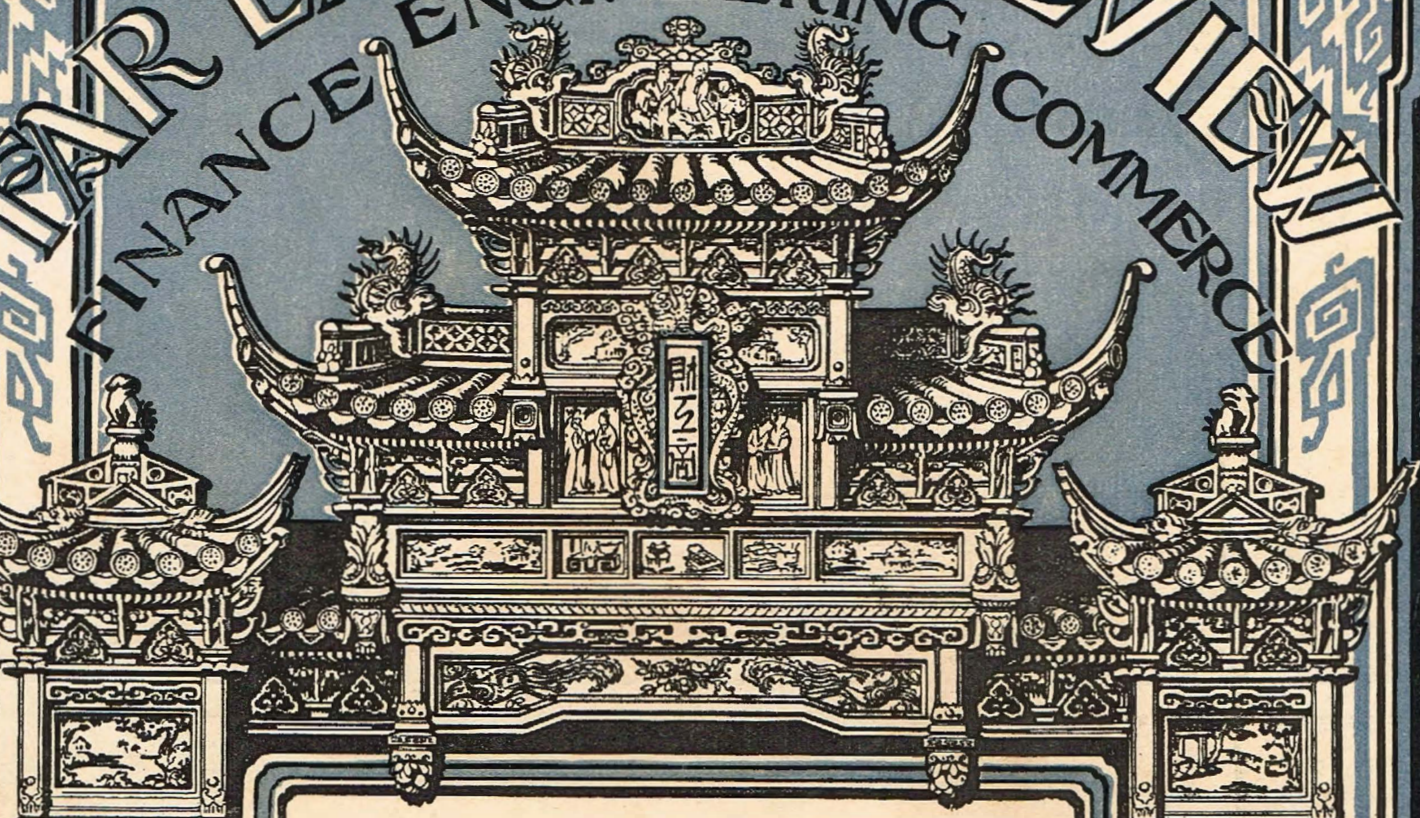
The incident, however, closed happily with a series of receptions held at the Imperial Threatre in Tokyo (in which Baron Okura is the chief shareholder) in honor of the occasion. Thousands gathered to pay their respects to this last of those leaders of Old Japan who had the foresight and courage to pry their country out of the rut of ages and elevate her through industry and commerce to her present proud position amongst the nations. The premier and members of his cabinet, officials of all grades and ranks in the service of the Mikado, bankers, manufacturers and merchants, whose names are famous in international trade and finance, members of the diplomatic corps, foreign and Chinese business men, noted educationalists, men of science and letters, and friends in many other walks of life gathered to honor him. The most nted actors of the Japanese stage and the famous Mei Lang-fang entertained them. It took five days to hold the receptions, a remarkable tribute to the esteem in which he is held not only in Japan but in other countries.

His business career ended, he now bravely announces his determination to pass the remaining years of his life in promoting friendship and closer relations between Japan and China. He very wisely declares that if permanent friendship is to exist between the two countries it must be based on economic co-operation and to place these ideas into practice he says that notwithstanding his advanced age he will make a visit to Mongolia this spring to arrange the details of a new undertaking.

Diesel Vessel p.145

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE



上海仁記路拾六號

遠東時報

SUN YAT-SEN

First President of the Republic of China, Revolutionist and Patriot, the Leader of the Movement to Modernize an Ancient Nation

BACK TO PORTSMOUTH

THE RECRUDESCENCE OF JINGOISM

CHINA PROTESTS IN VAIN

DEVELOPMENTS IN THE FAR EASTERN IRON AND STEEL INDUSTRY

CHINA'S RAILWAYS

DESCRIPTION OF A SHALE OIL DISTILLATION PLANT

EARTHQUAKE DAMAGES TO THE TELEGRAPH AND TELEPHONES

PULVERIZED COAL PLANTS

CENTRAL WORKSHOPS OF THE F.M.S.

Vol. XXI | March, 1925 | No. 3

China's Railways

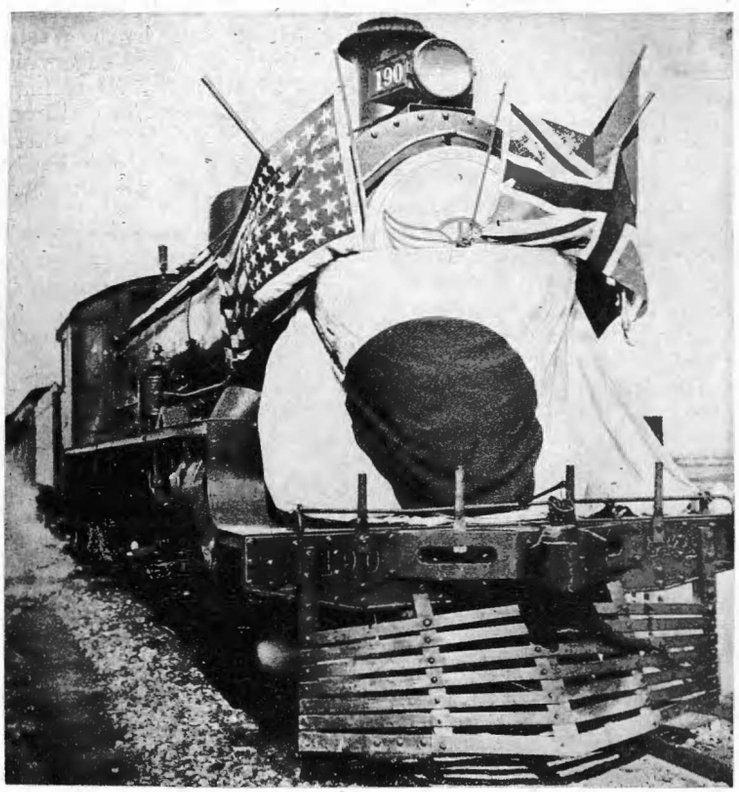
Deplorable Condition of Railway System Due to Civil War and the Seizure of Cars by Militarists

DURING the recent civil war in China, which, by the way, is far from being concluded, the railways of the country were utilized by various generals for the transportation and quartering of troops. The rolling stock, including the very fine "Blue Express" cars, were seized by the various commanders who used them for their own purposes, in a shabby, thoughtless manner. The locomotives were taken from one line to another, each commander hoarding as many as he could get, against the possibility of a hasty retreat. First class passenger coaches became the field headquarters of generals; third class coaches, the barracks of the troops. The destruction of property has been very great, but during the days of fighting there was no power in the country strong enough to gainsay the arrogant militarists.

It must be borne in mind that during the whole period of the war, commencing at the end of August and not yet altogether over, passenger and goods traffic was altogether dislocated. The merchants, particularly foreigners protested, but in vain. No one could question the right of a military man to do anything he pleased, to destroy private or national property, to imperil foreign obligations or domestic responsibility. In a military oligarchy, the whims and wishes of the soldiers transcends all else.

Mr. Yeh Kung-cho, Minister of Communications, an experienced railroad man, states the case clearly and forcefully in a memorandum to the government. He says:

"Worse is the fact that not only have communication affairs not been actively promoted, but they have been thwarted in many respects, revenues along this line being detained, railways being offered as security for negotiating loans, employment of officers and even workmen being interfered with, soldiers and high officials being always exempted from being charged, cars and locomotives being detained in great numbers.



The International Express from Peking to Tientsin; the only safe train for travel out of the capital during the stirring days of the last war

"It was estimated that, up to September, 1924, no less than $707,300,000 should enter the debit side in carrying on (by no means promoting) communication affairs. This figure has neither greatly increased nor decreased, remaining somewhat the same at present. What is most lamentable is that a process of undermining has been going on in the economical foundation of these communication affairs. Scarcely can a balance be kept between receipts from and expenditure for these communication enterprises. Formerly, though the payment of domestic loans had frequently been delayed, foreign loans never failed to be duly repaid. But this is not the case at present. Foreign creditors such as the Japanese Specie Bank, the Ta Pei Company, the Ta Tung Company, and others as domestic creditors suffered delays repayment of both the principal and the interest. As a natural result of this, the credit of the authorities of communications has been destroyed to a large extent."

With the railways so disorganized, it is only natural that the financial obligations of the Ministry of Communications should not have been met. It is interesting to note that Mr. Yeh Kung-cho gives his figures up to September 12 of last year. This is probably due to the political situation in China. The figures would have been much worse if they were given up to January 1, 1925, for they would then have included the three worst months of the war, when the ministry of communications had practically no revenue.

Mr. Yeh gives three methods of solving the problem:

"1. Those, which can be duly paid with available resources as such as the Tsin-Feng Railway loan, Tsin-Pu Railway loan, and Fu-Ling Railway loan, amounting to a total sum of more than $319,200,000. They have and will be regularly paid by the revenues of these railways.

"2. Those which should be liquidated by institutions of telegraphic communications amount to some $80,000,000, and they should be repaid by the surplus derived from these institutions.

"3. A little more than $219,900,000 will be met with ways to be worked in the whole reorganization plan of the country, although a part can be met by the Ministry of Communications, the remainder being beyond the possibility of the ministry.

All these suggestions are premised on the possibility of the railways and telegraphs having full command of their property and the unimpeded opportunity to collect its revenue. This is just about next to impossible at the moment of writing.

Many suggestions have been made for the improvement of China's railways. One is the internationalization of control—an idea which we have opposed as being impractical and offensive to the Chinese people. Another, is a huge loan by the consortium to set the railways straight and to start them off again on a business basis. Whatever plans are adopted, depends largely upon the willingness of China's military men to envisage the situation of China, to realize that in destroying the rolling stock and equipment of the roads, they are sacrificing the interest of foreign financiers in the railways of China, which is a serious matter to a country which has to have foreign capital for the development of the country.

If the militarists in China would only let the railways alone, the Ministry of Communications could effectively handle the proposition. There are a fine lot of young men in this ministry, most of them educated in the United States, trained in railroad engineering and competent to develop a railway system. These men are of the type that Japan sent into Manchuria to build up that wonderful institution, the South Manchuria Railway. They could do good work, if only they had the chance.

The Hung Chiao Red Bridge, now at the bottom of the Hai Ho

The International Bridge—To be Replaced by a New Bridge

A Year in Tientsin

Flood, Famine and Prosperity Mingle in Northern Metropolis

IN spite of floods and famine and the depredations of the soldiers, Tientsin continues to develop industrially. The following notes give but a slight indication of the prosperity of this growing city.

Tientsin is the distributing centre for the northern provinces of China, it is the key to Peking with which there is connection by rail, and the Grand Canal is responsible for the transportation of native goods to places which are not accessible by rail. In favorable years the yield of cereals in Chihli province is large, but owing to the flood menace during the summer of 1924 the crops of the locality were destroyed; the flood which threatened Tientsin during the months of July, August and September, caused the inundation of several districts in the interior, with the result that much of the farm produce such as ground-nuts, cereals, etc., could not be taken to the market at all. Goods such as skins, wool, etc., could not be brought to town, villages were submerged, communication was entirely interrupted; the roads were like rivers, bridges were carried away by the flood, and only small quantities of goods could be sent in by the aid of boats.

The force of water broke away parts of the embankments, which served as roads, the water rushed in and destroyed the crops; several miles of land were under water, nothing was visible on the surface but the tops of the trees, and when the flood abated the trees were all that was left on the fields.

When the flood menace ceased in September, the local war started. Railway cars were commandeered by the military for army use; soldiers, houses, and war-material were rushed to Peking, from there to Shanhaikwan, and the trade of Tientsin suffered from political unrest, war and flood.

800,000 acres are planted with cotton in the province of Chihli, and 130,000 in Shansi, yielding 242,000,000 and 33,000,000 pounds of cotton respectively, but 50 per cent. of the Chihli cotton is not expected to materialize this year; all Chinese-grown cotton is poor in quality, and unfit for manufacture of fine grade yarn, and foreign cotton is imported for the purpose of mixing with the local product.

A good quantity of wheat of an inferior quality is produced in Chihli. This arrives from the country in a dirty condition, which is due to the fact that it is threshed on floors made of mud, most of it is ground in local flour mills, and used for native consumption.

Perhaps the peanut trade suffered more from flood than any other industry; the whole of the Chihli province is noted for peanuts. The best quality of peanuts are grown in the locality of Lanchow, the nuts produced there have thin white husks, which are in great demand in the American market. Almost every Chihli farmer has a portion of his ground allotted for peanuts, no parts of these nuts are thrown away or wasted; the creepers on which the nuts grow are used for fuel, the kernel is a valuable article of food, no Chinese dinner being complete without peanuts, either roasted or salted, and the husk, which ignites quickly, is used for starting fires.

When peanuts arrive in Tientsin from the country, several thousand women and children are employed in picking and sorting them; the first quality (about 30 to the ounce) is usually sent to the United States, the second and third qualities are also exported abroad, and the nuts which are not fit for exportation yield a fine amber-colored oil.

Shantung is also a large peanut-producing province. The oil is pressed and sent to Tientsin, where it is cleaned or refined and repacked into barrels for exportation to London; after the oil is pressed from the nut, the residue left over is made into round cakes and used as a fertilizar. Many merchants are engaged in the peanut business, walnuts and peanuts both shelled and unshelled, form some of the most important articles of the Tientsin export trade.

Owing to the shortage of wool, which could not be sent to town during the summer, the carpet-making industry was curtailed, these carpets command a high price in foreign markets, and are exported in large quantities to the United States; there are some local carpet factories, but those exported are chiefly made in small native work-shops.

A new factory for the purpose of making glass and crockeryware has recently been erected in Chingwantao; the capital for this plant was invested by Belgiums and Chinese, and the business is controlled by the Kailan Mining Administration, whose building on Meadows Road is a large institution. The word Kailan was derived from Kaiping and Lanch'ow formerly the names of two coal mines, which were amalgamated.

At the corner of Bruce and Devonport Roads Messrs. Elbrook & Co. (*Hai-Ching-Kung-Si*) have started a dyeing and spinning factory, which is equipped with the latest spinning machinery. There are two large spinning mules containing 390 spindles each; this plant can dye from 1,000 to 1,300 pounds per day in fast colors.

Troop Trains at the Tientsin Station

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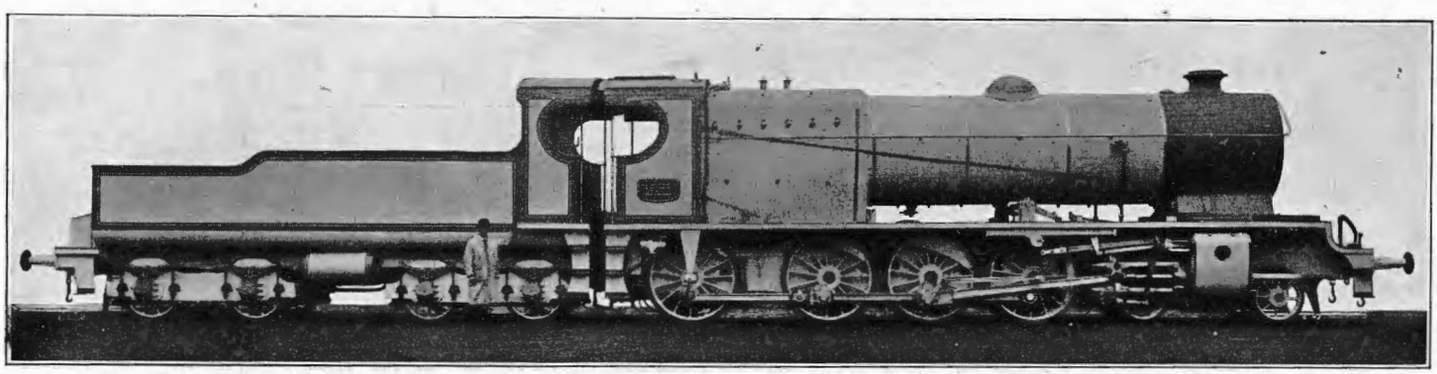
PEKING



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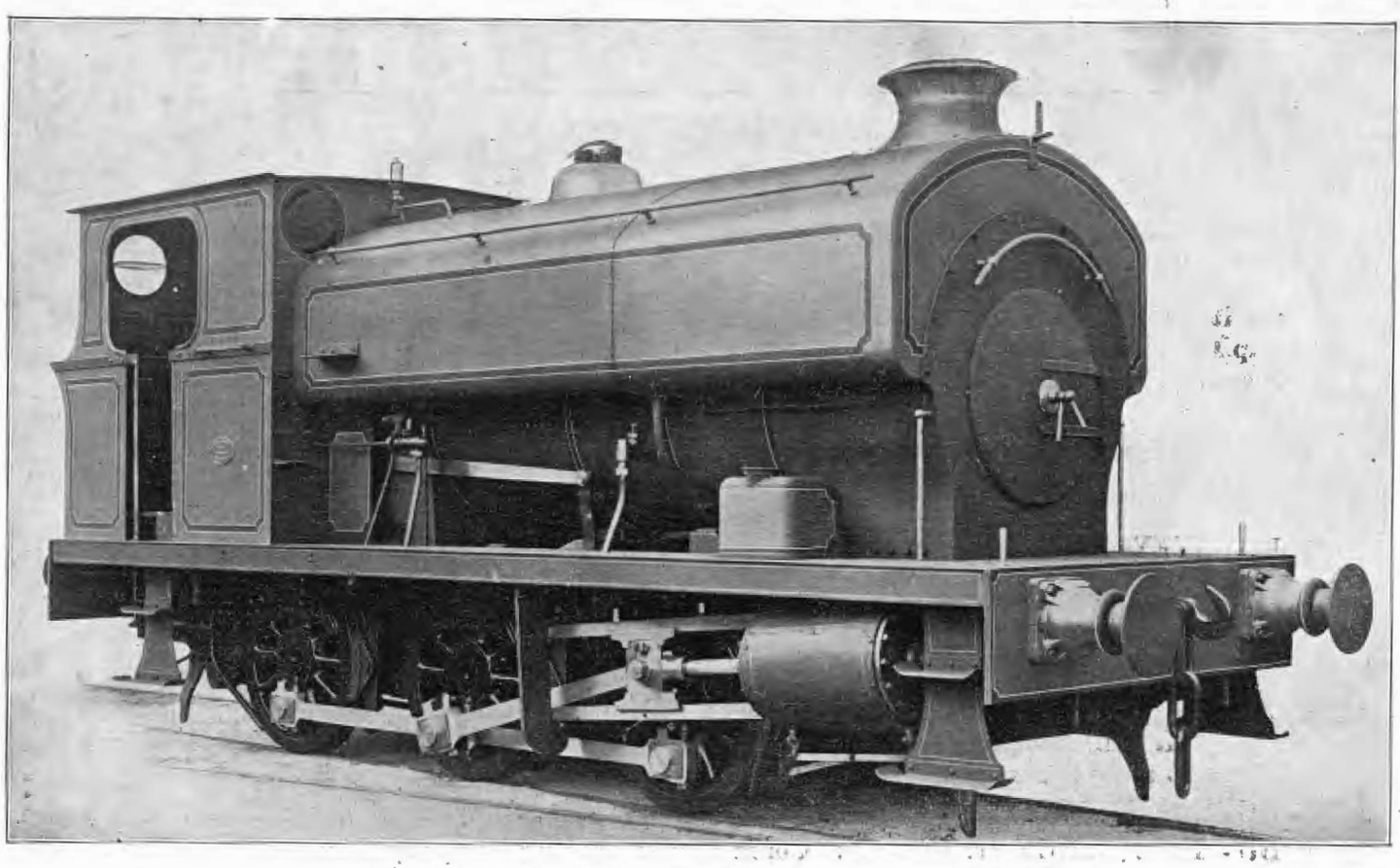


AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

DR. JACOB GOULD SCHURMAN

JAPAN'S ALIEN LAND LAW

THE SINCLAIR OIL CONCESSION

MR. KODAMA'S ADDRESS TO THE YOKOHAMA SPECIE BANK

CHANGING FACTORS IN THE ECONOMIC LIFE OF CHINA

GREATER OSAKA

PEKING ELECTRIC TRAMS

NEW AMERICAN CLUB IN SHANGHAI

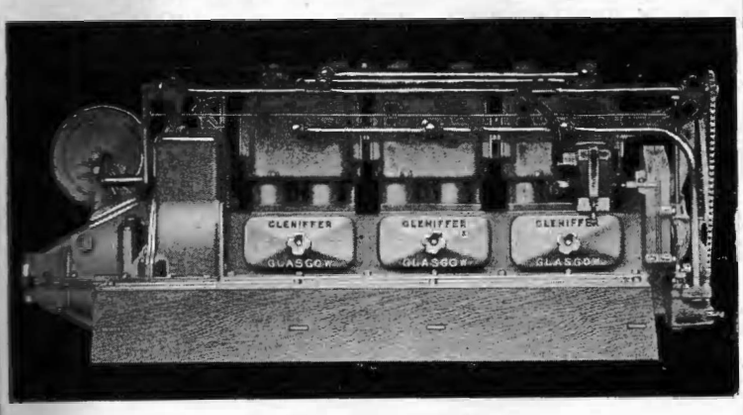
LARGE REINFORCED CONCRETE OCEAN TERMINAL AT MANILA

F.M.S. RAILWAY FORESIGHT

Vol. XXI April, 1925 No. 4

SHANGHAI, PEKING, TOKYO AND MANILA

GLENIFFER
MARINE MOTORS



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All working parts entirely enclosed, thus ensuring silent and clean running.

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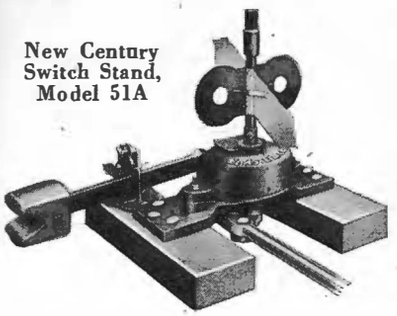

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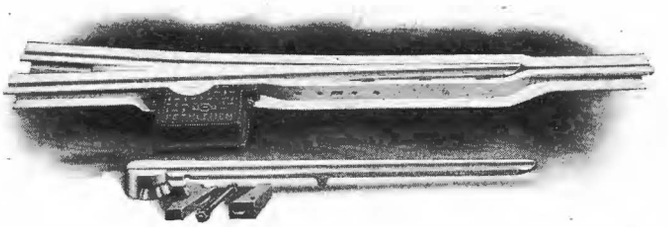
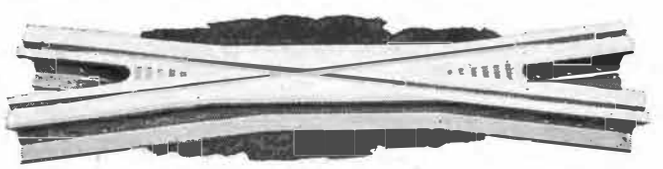
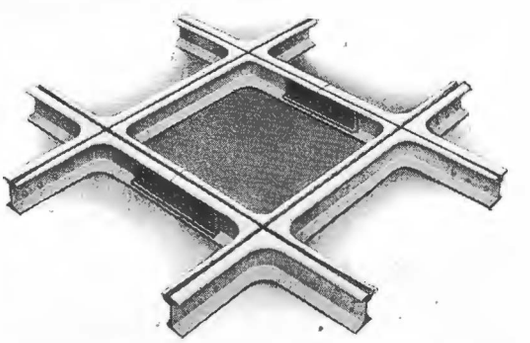


Solid Manganese Tongue Switch, Design 905, for electric railway service is of the "Big Pin" type, providing maximum bearing surface or support at the heel. The positive action of the hold-down block resists any tendency of the tongue to rock under side thrust, or "kick up" at the point due to the pounding action of car wheels.

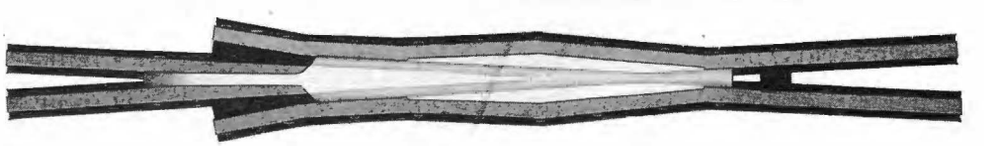
Solid Manganese Mate, Design 920, for electric railway service, is of the same construction as Frog, Design 940.



Solid Manganese Frog, Design 940, is an electric railway design cast in one-piece of manganese steel. The top surface is finish-ground to insure an absolutely level running surface. The ends are accurately ground to fit the connecting rail and splice plates.



Solid Manganese Crossing, Design 1314, for electric railway service is cast of manganese steel. The top surface is finish-ground to insure an absolutely level running surface. The ends are accurately ground to fit the connecting rail and splice plates.



Railbound Manganese Steel Frog, Design 177, is a steam railway design, built up of a one-piece manganese steel centre, securely bound throughout its entire length by full-section reinforcing rails. The bolts are of heat-treated Mayari Chrome Nickel Steel, fitted with extra thick units. This frog combines to an unusual degree the best features of safe construction and long-wearing qualities.

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The aim of this magazine is to enlighten the questions of economics and civilization in the Far East.

The journal will contain original articles and notes on the character and history of the population, its conditions of life, civilization, industry, finance, transport and natural resources of Far Eastern countries, and chiefly Manchuria, international relations, bibliography, etc.

The first issue will contain the following articles :—

"Ominous heat lightning flashes in Eastern Asia," by G. Diky
"Russia in the Far East," by Prof. N. N. Ustrialoff
"Agricultural importance of Manchuria," by E. E. Yashnoff
"The recent civil war in China," by Prof. V. V. Engelfeld
"The socialist movement in Japan," by N. P. Mazokin
"The Maritime Province in the past few years," by V. Toogoff
"American explorations in Mongolia," by Prof. V.V. Lamansky
"Opportunity for raising soya beans in Russia," by M. D. Gleboff
"Population and Progress," by G. R. Davies
"International Life," by Asiatic
"Sights of Peking," by Prof. N. N. Ustrialoff
"Give a citizen," by E. Lejneff
"Co-operation in the USSR," by G. B.
"The Manchuria Tiger," by Baikoff
"The ruins of Paicheng," by Tolmacheff

A weekly "Economist Bulletin" will be issued as a free supplement to the "Manchuria Monitor," containing orders and regulations regarding the commercial operations of the Chinese Eastern Railway : the most important information in respect of the commercial and industrial life of North Manchuria and neighbouring countries ; current information of the activity of the Chinese Eastern Railway and the adjoining railways as regards commercial operations, bulletines of the Harbin Bourse and other important exchange in the country, reviews and notes on the more important economic problem of the Far East and so forth.

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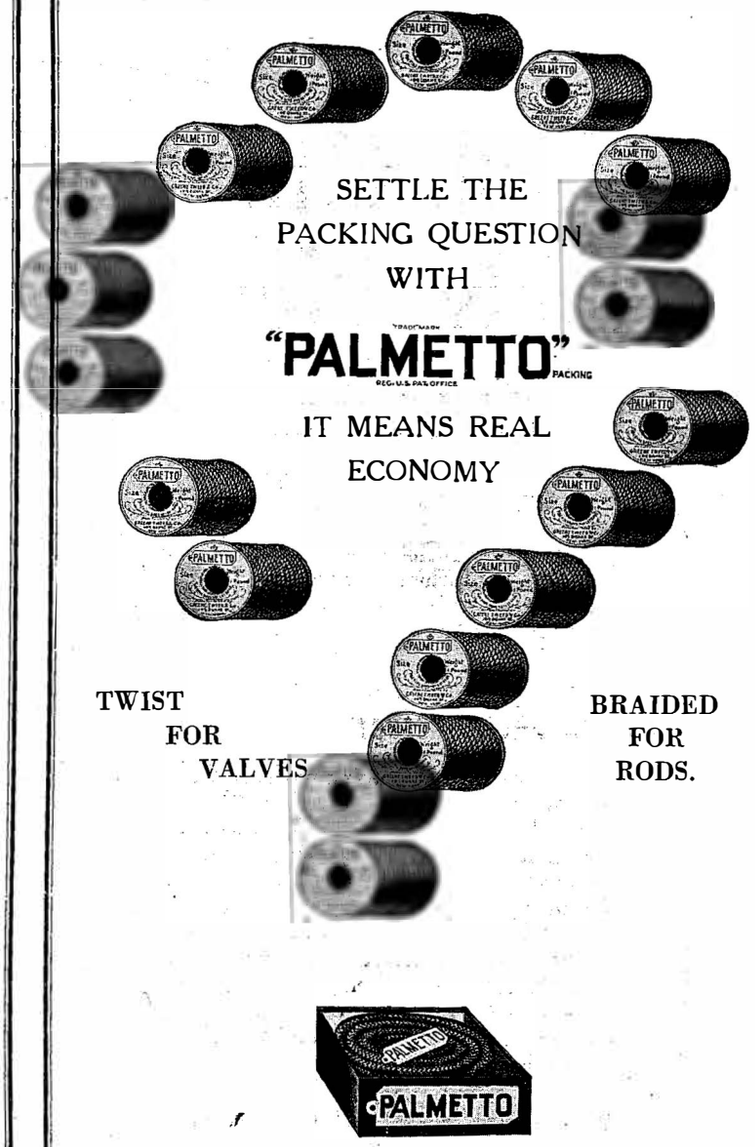

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THE FAR EASTERN REVIEW

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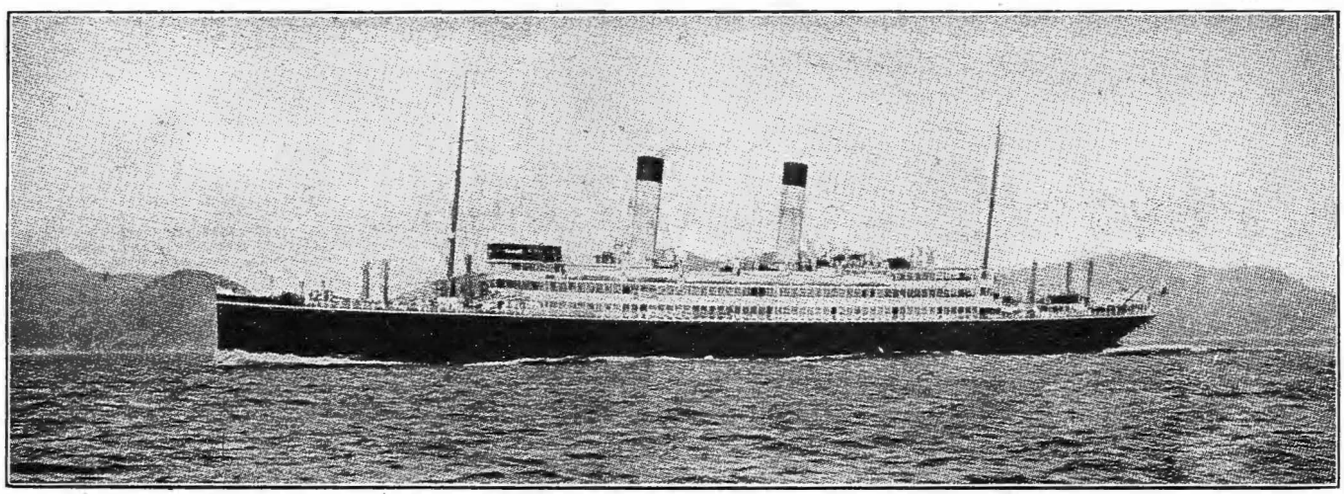

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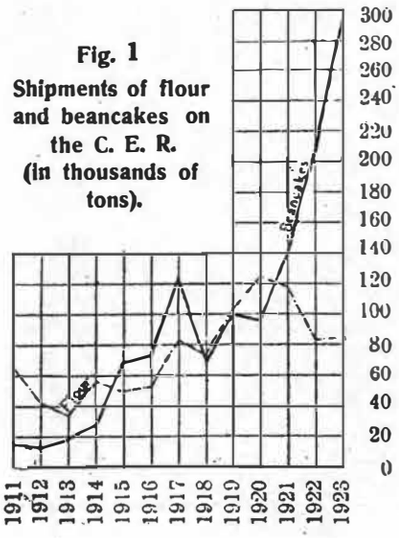


Fig. 1
Shipments of flour and beancakes on the C. E. R. (in thousands of tons).

Generally speaking, the sale of a manufacturing enterprise was as a rule accompanied by an imprevement in its financial condition because of the capital invested in the same by the new owner. This, however, could not radically change conditions under which industry labored, and the new owner often went through the experience of his predecessor, ending, as he had done, with a sale of the enterprise.

A more effective means was the combination of several similar enterprises into one, which was achieved either through the purchase by one person or through consolidation.

During the last three decades there have been many cases of such consolidation. Some of these have proved sufficiently solid, and are in existence even at the present time, while others were ephemeral and disappeared without leaving a trace. Others still are being established at present, and the future will show what their fate will be and the influence they will have on their respective branches of industry.

Among cases of transfer of manufacturing enterpriess from one owner to another, those are particularly interesting which record the acquisition of an industry by a dealer in or exporter of the corresponding product. The contrary interests represented by trade in raw materials and the export thereof thus become one with those of the manufacturer; otherwise these interests would have been forced to find a peaceful solution outside the firm. The resulting natural endeavor has been to exchange the exporta-tion of raw materials for export of the finished product.

Head Quarter of Chinese Eastern Railway Guard, Harbin

The export of finished products may be regarded as the third phase in the development of Manchurian manufacturing industries. This phase appears to us to be the natural end for the development of the entire economy of North Manchuria as a whole.

It should here be remarked that the division into three phases established by us refers only to the interior organic process of industrial evolution in North Manchuria. Like every other scheme, it differs by its apparent simplicity to a certain degree from actual conditions. The history of the growth of the various branches of manufacturing industries, as a matter of fact, presents rather a complicated picture, rich in important changes and deviations from the main road, which will be noticed when each of them is treated separately.

It would appear that if the export of finished products of North Manchurian industry were placed on a permanent and solid footing this would mean that it had reached its highest degree of development, where it was on a level with industries in other parts of the world. Rather it would only be necessary for this industry not to lag behind in technical progress and to improve the economic organization of the industry, while it at the same time would have the advantage of an abundance of labor, the lack of which is the greatest handicap to European and American industries.

North Manchurian manufacturing industries, however, have not attained this high level, and it is doubtful whether this will be reached in the near future.

Manchuria in general and North Manchuria in particular, is predestined to play a subordinate role with relation to the world market, as a more or less important base of supplies. Manchuria is primarily an agricultural country, and for this reason fitted for its role of a granary.

The manufacturing industries of North Manchuria are of dual importance to the world market. First, they supply local requirements, thereby impeding the importation of manufactured articles from abroad. Secondly, Manchurian manufactured articles in the world market have up to the present time been an improved method of transporting the finished product rather than the raw material, and they have by no means constituted any successful competitor to world industries. It is worthy of note that up to the present time flour mills and bean oil mills, the most important industries in North Manchuria, are enjoying in their export transactions the benefit of lower freight rates on the C. E. R., than those granted to exporters of wheat and beans.

The exportation to Europe of bean oil or flour, for instance, may be looked upon as a less expensive means of transporting beans or wheat.

The World War

The world war proved this trait of Manchurian industrial export with particular clearness. Even as in Russia, where an unusual demand for manufactured articles during the war required manufacturers to remove from their warehouses, where useless junk was kept, machinery which had already outlived its time and once more put the same to work on an equal footing with equipment of modern pattern, so the war forced countries to step out into the industrial arena which under normal conditions, because of the standard of their technical development, could not even have thought thercof. The deciding factor was not the perfection of the product, but conditions of transportation. For this reason Japanese piece goods conquered the entire Asiatic market; they reached as far as the Ural, and, as military goods, to the very city of Lodz. For the same reasons there was created an export of bean oil from Manchuria to Europe and America, Manchurian flour was sold in the market places of Irkutsk, and so forth. The world war brought back to Manchurian manufacturing industries a revival of the glorious period of the Russio-Japanese War, with the only difference that the same was played on a broader field and ended with complete ruin for individual manufacturers.

It is a well known fact that one of the principal reasons for the local industrial catastrophe was the rapid depreciation of Russian banknotes, as a result of which manufacturers, similarly to other holders of Russian paper currency, found themselves without funds. It is natural that the collapse of the Russian currency was a particularly hard blow to enterprisers of Russian nationality. Many of them were forced to sell their manufactories to their more fortunate foreign competitors. The depreciation of the rouble

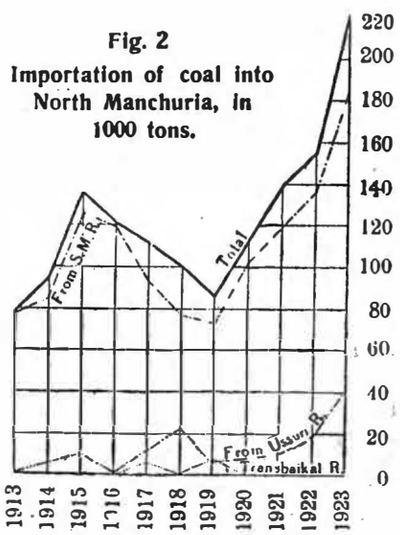
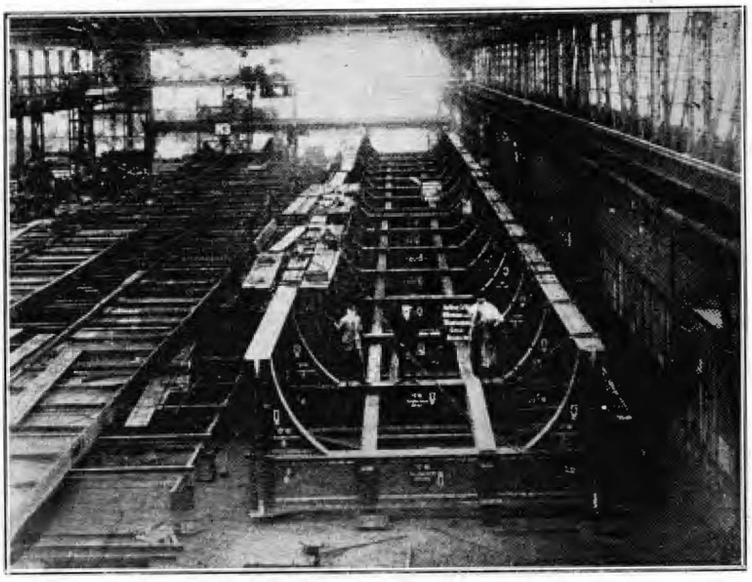
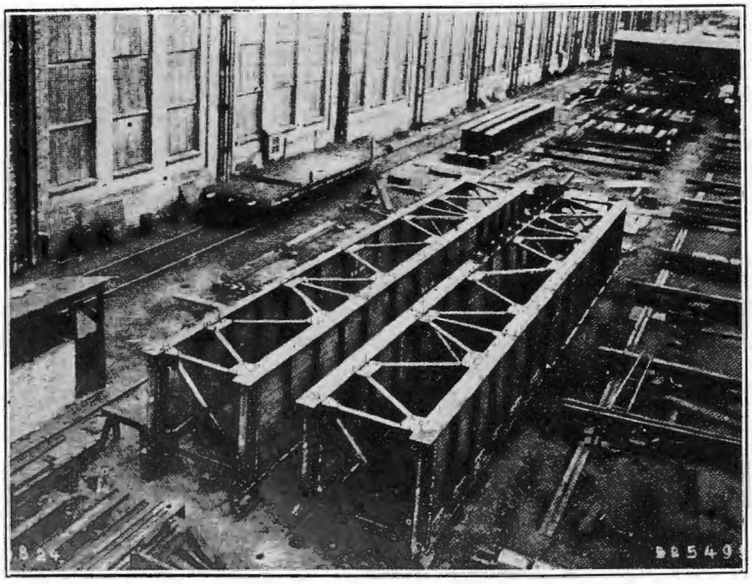


Fig. 2
Importation of coal into North Manchuria, in 1000 tons.





The types of girders now being erected in the Kiao-Tsi Railway. The through girder and the deck girder. Pictures taken in Germany at the workship

Reconstruction of the Kiaochow-Tsinan Railway Bridges.

By F. K. Sah, Chief. Engineer

THE existing bridges on the Kiaochow-Tsinan Railway, were put up by the German Engineers in 1901-1904. They are the type of bridges specially designed in Germany for colonial lines where the loading adopted is generally very light. But due to the rapid increase in the volume of traffic on this line, heavier locomotives had to be resorted to, consequently the factor of safety of these bridges decreased correspondingly.

Before the great war the German Engineers had worked out a plan for the strengthening of some of the important bridges on the line, but this plan had never been carried out. By adopting still heavier American locomotives of the Pacific and Consolidation Types (E-35 loading) during the Japanese Administration, 1914-1922, these bridges were further decreased in their factor of safety. Even if the German plan of strengthening had been carried out, the factor of safety would still be too small to carry these heavy American locomotives according to the American practice in bridge designs.

Since the taking back of the railway by China it was obvious that many necessary improvements of the Railway must be carried out and the bridge question being the most important was the first to be taken up. Upon the strength of the bridges depend the choice of the locomotives and rolling stocks which in turn effect the speed of the trains and the hauling capacity of the line.

At first the plan proposed for strengthening the bridges was to make use of the old structures by doubling up two trusses into one and encasing the small plate girders in concrete. But this plan was abandoned because it could only strengthen the bridges sufficiently to stand the present loading, making no provision for the increase in loading which is inevitable in the very near future. So finally it was decided to replace all the existing bridges by new bridges of Cooper E-50 which is the standard loading for new main lines of the Chinese Government Railway System.

Before this plan of changing all bridges to E-50 loading could be carried out, a temporary measure was planned and adopted to make the running of trains over existing bridges in the meantime as safe as it is within the power of the engineering department to make them. This temporary measure includes the changing of all loose rivets, repairing of cracks and bent members, constructing timber bents where possible to lessen the strain on the structural members, and strengthening of weak joint connections particularly the centre diagonals and stringer connections.

The bridge program, as finally adopted, involves the scrapping of approximately 847 spans of minor and 150 spans of major bridges aggregating a gross tonnage of approximately 8,500 tons and the replacing by approximately equal number of new bridges aggregating a gross tonnage of approximately 15,000 tons. The total cost of the entire program, including cost of handling, dismantling, erection and the remodelling of piers and abutments, etc. is estimated at M.$3,800,000. The work of reconstruction is to be started in March, 1925 and to be completed in three years.

The following types of bridges have been adopted :—

1 m. to 3 m. spans ;	Old rails, old channels, or I-beams imbedded in concrete.
4 m. to 10 m. spans ;	I-beams imbedded in concrete.
12 m. to 30 m. spans ;	Plate girders.
35 m. to 46 m. spans ;	Trussed bridges.

At the time of writing 33 plate girders of 15 m. to 30 m. spans aggregating 2,180 tons have already arrived at Tsingtao. Orders for these bridges were placed with G. Borkowetz representing Machinen-Fabrik Angsburg—Nuernberg, Germany, on May 24, 1924, at the unit cost of G.$82.80 per ton C.I.F. Tsingtao. The first shipment consisting of 17 spans arrived at Tsingtao on November 8 and the balance of the entire order arrived at Tsingtao on February 10, 1925.

The contract for the reconstruction of 26 spans had just been awarded to Yu Ching Construction Company of Shanghai at a total cost of $56,262. According to plan these 26 spans are to be erected by end of May, 1925.

The Tientu Light Railway

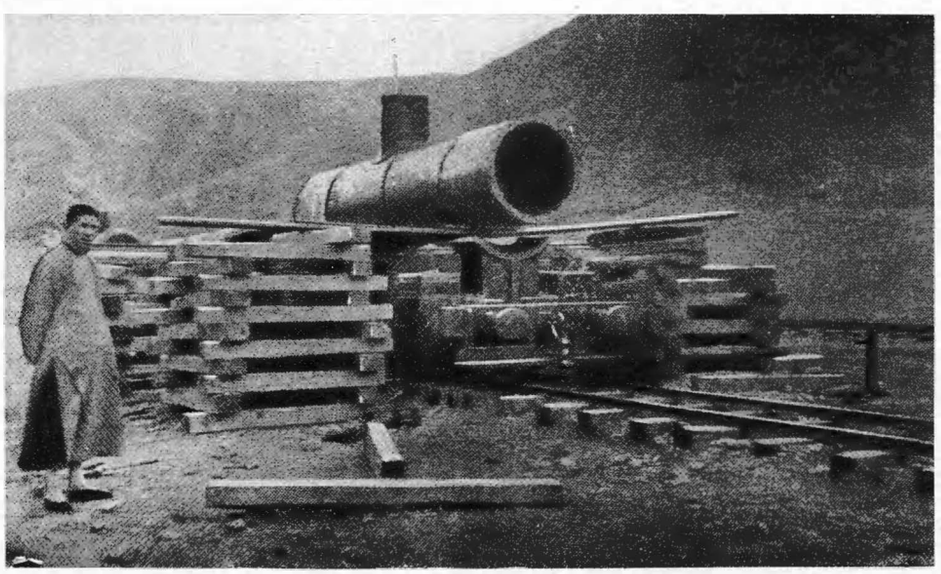
By J. W. Kelker

THE project for the construction of a light railway in Kirin province, North Manchuria, has its inception in 1915. This railway was to start at the Chinese border on the Tumen River, twenty-five miles North of Kwainei at a small town known as Tumen River Siding, opposite Komosanbon, and extend to the Tienbaushan silver and copper mines, a distance of seventy-three miles. In addition, a branch line six and a half miles long was to be constructed, making a total of seventy-nine miles.

The Tienbaushan mines, which include a smelter and refinery, were built in 1915. Rapid progress was made in development work and operations continued until 1919 when they ceased on account of the low market of price of copper. These mines, however, have recently resumed operations.

As laid down in the project the work called for the construction of a light railway of 2-ft. and 6-in. gauge, with 25 lb. rail, to connect the Tienbaushan Mines, at Komosanbon, with the Tumen River Light Railway operating in Chosen along the border of China. At first the Chinese were opposed to the construction of this line, but in the latter part of 1922 a joint Chinese-Japanese stock company was organized with a capital of four million yen and stock equally divided, that is, 50 per cent. Chinese and 50 per cent. Japanese, and work on the new line, which was known as the Tientu Light Railway, was begun. The company was organized as follows: Chief Director, Chinese, Mr. Tao, Chinese Governor at Yenkiting; President, Japanese, Mr. Iida, of Tokyo; a dual management consisting of Mr. Ishibashi, Japanese General Manager, and Mr. Chia, Chinese General Manager; Chief Engineer, Japanese, Mr. Fukai, under whose jurisdiction came the superintendence of the surveys, track equipment, buildings, and the construction of the railway.

Construction work on the first division, thirty-six miles long, to Lungchingtsun, proceeded rapidly through a hilly and even mountainous country which made it necessary to lay out a line with grades as high as 1.7 per cent. and with numerous curves of 264-ft. radius. This division was opened for traffic on October 10, 1923.



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The second division, from Lungchingtsun to Laotaokou, a distance of twenty-seven miles with a six and a half miles branch line to Yenkiting, was graded in the fall of 1923 and the spring of 1924 and new rails and track laid in July, 1924. It is expected that this division will be complete and in operation early in 1925.

The third division, from Laotaokou to Tienbaushan, a distance of ten miles, will in all probability be graded early in 1925.

Since the construction of the railway many small villages have sprung up, and in the town of Lungchingtsun almost a thousand new houses have been constructed and many new streets laid out, graded and surfaced. Every town has a well-built station with waiting rooms for passengers and quarters for the station men. The main offices and shops of the railway are located at Lungchingtsun. The shops are built in connection with the round house and have equipment sufficient to handle running repairs. The machine shop is equipped with a wheel lathe, hydraulic press, three small lathes, a shaper and a milling machine. The power to operate the machinery is furnished by gasoline motor.

Water tanks along the right of way are built of wood. The water supply is derived from wells and the tanks are filled by a coolie, hand bucket system. During the severe winter weather considerable difficulty is experienced in preventing the water from freezing in the tanks.

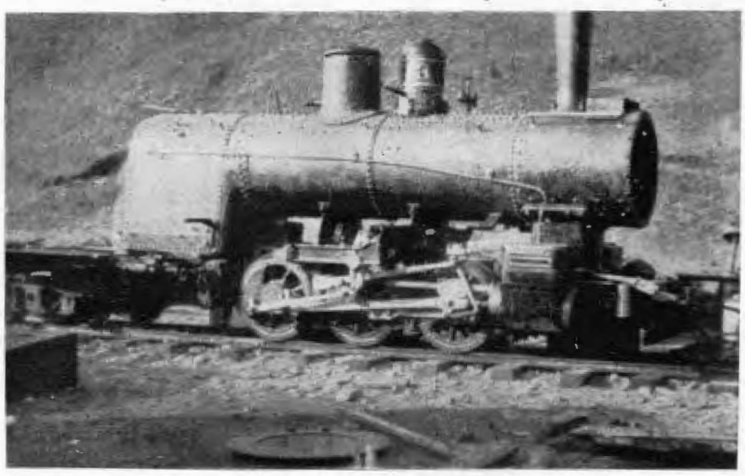
The Tumen River Railway has constructed a temporary double track bridge of timber across the Tumen River between Komosanbon and Tumen River Siding on the Tientu Railway for the use of push cars in the transfer of cargo. The Chinese were much opposed to the building of this bridge and asked on several occasions for its removal, but an agreement has now been reached whereby a permanent structure will be built. This will insure through railway service from Tienbaushan and Lungchingtsun to Kwainei and will save a great deal of time and expense by avoiding the unloading and transferring of cargo at the bridge head. The Tumen River Railway stockholders are also interested in the Tientu Light Railway. These two lines are constructed to utilize the same type of cars and locomotives and built to the same gauge, therefore, their equipment is interchangeable and will facilitate the interchange of traffic.

The section of country in which the Tientu Light Railway operates is practically under Japanese supervision and this includes the telegraph and telephone system, and prior to 1923 also included the post office. There are approximately 250,000 Koreans resident in this district. Lungchingtsan, the largest important town, has a population of 20,000 Koreans, 2,500 Chinese and 800 Japanese. It is the headquarters of the Japanese consular district as well as the Chinese customs. Lungchintsun is a progressive town with well laid out streets and good drainage facilities, and included among its buildings a Japanese hospital and many schools for Chinese, Japanese and Korean children. Among other important institutions the Bank of Chosen and the Canadian Presbyterian Mission are noteworthy. Agriculture is the sole industry, the principal exports at this time being soya beans, millet and wheat. The export of grain from this district in 1922 approximated 52,000 tons, transported by ox carts. In 1923 exportation had increased to 66,000 tons approximately, 33,000 tons handled by the new railway and the remainder by ox carts. The tonnage handled by rail represented its maximum capacity which was necessarily limited by the shortage in locomotives and cars.

A lignite coal mine, now in operation, is situated at Laotaokou. Upon completion of the railway to this town the coal supply will be utilized by the railway and by towns along the line. Coal will also be exported to Chosen inasmuch as the quality of coal in north Chosen is poor. At the present time the inhabitants of this district use twigs and dried weeds for fuel, as there is no available timber supply.

By reason of the extension of the main line and the anticipated increase in traffic, the Tientu Light Railway purchased from The Baldwin Locomotive Works, six 0-6-4 type, class 10-14 1/3D locomotives for passenger and freight service. These locomotives were designed with large fire-boxes to burn the grade of coal peculiar to the territory, and with hauling capacities sufficient to handle

The Re erected Baldwin Locomotives Under Steam



Bolier Bolted to Frames and Cylinders

trains of 90 tons over the heavy grades. The order was placed on September 22, 1923, completed at The Baldwin Locomotive Works November 29th, and delivered at Kobe on February 15, 1924. Unexpected delays at Kobe caused by the earthquake, prevented delivery to the railway at Tumen River Siding before April, 1924. The locomotives, however, were all re-erected by May 16th and were placed in service two weeks later. The Tientü Light Railway at the present time has eleven American-built locomotives, 1925 freight cars of five tons capacity, both box and gondola types, ten, four-axle flat cars, and approximately thirty passenger cars of the four-axle type.

It is planned to extend this railway to Kirin in the near future, but this is a political question for decision later. The prospects for extension are very encouraging and as the railway will collect a considerable amount of freight for transportation to the Chosen territory and the port of Seishin at the end of the South Manchurian Railway (Chosen lines), this line will eventually reduce the length of haul from North Manchuria to tidweater. At present the project calls for the opening of the country adjacent to the Chosen territory and the transportation of coal, ore and grain to the Japanese port of Seishin. It may therefore be expected that by the aid of modern transportation through a highly fertile country progress will be rapid, and the introduction of new capital into North Manchuria will necessitate the construction of the standard gauge line from Kirin to Kwainei, a step of extreme importance in the future development of China.

Cylinders Blocked Up to Facilitate Placing Wheels Under Frames

Sliding Water and Fuel Tanks Into Place

Indian Contracts

Of late a large number or more or less important contracts have been made for supplies for the Indian market, as well as many further tenders being called for. Vickers have supplied considerable quantities of pressed steel parts for rolling stock for several of the Indian Railways as well as many wheels and axles for the Great Indian Peninsula Railway; for the Bengal-Nagpur Railway a number of "all steel' wagons, and high sided and covered goods wagons for the Assam Railway. The South Indian Railway Company is calling tenders for 45 bogie steel covered wagons. The Bombay, Baroda and Central Railway Company is making enquiries for quantities of switchgear, rotary converter sets and transformers, and independence bonds for track circuiting. The South Indian Railway Company is calling tenders for steel covered goods wagons. Messrs. Beyer, Peacock & Co., of Manchester, are constructing two large "Garrett" locomotives for the Bengal-Nagpur Railway. These engines will be the most powerful locomotives operating in India. The Bedford Engineering Co., of Bedford, are making two large electric "Goliath" cranes, running on rails 60-ft. span for the Indian Stores Department. The British India Steam Navigation Company have placed another order for a 10,000-ton steamer with Hawthorn, Leslie & Co., of Wallsend-on-Tyne.

In India an expenditure of £2,000,000 has been ear-marked by the Madras and Southern Mahratta Railway for new locomotive and wagon building shops near Madras. The construction of the Raipur Partbartipur Chord Railway from the Central Province to a proposed new port near Vizagapatam is likely to make an early beginning, while a new line, 84 miles long, in the Barsi district, has been sanctioned by the Government, and the £500,000 capital required is about to be raised in London. The Nizam State Railways are to build huge railway works at Secunderabad to British designs. Electrical plant and equipment is to be purchased by a Burmese lighting company.

Worthington Locomotive Feed Water Heater Awarded Medal

ANNOUNCEMENT has been made that the Franklin Institute of Philadelphia, U. S. A. has awarded a special medal to Mr. Thos. C. McBride a prominent member of the Worthington engineering staff, in recognition of his inventions connected with the famous Worthington feed water heater and feed pump for use on locomotive.

Mr. McBride has been one of the Worthington organization for nearly thirty years and is Manager of the Department in charge of this particular apparatus. He is a native of Philadelphia and a graduate of the University of Pennsylvania, with the degree of M. E. He is a past president of the Engineers Club of Philadelphia and is also a member of the American Society of Mechanical Engineers of New York, the Manufacturers Club and the Franklin Institute of Philadelphia.

The medal of the Franklin Institute is one that is very highly prized among American Engineers and is awarded only for inventions of high order and for particularly meritorious improvements and developments in machines and mechanical processes.

The basic principles of the Worthington locomotive feed water heater were evolved by Mr. McBride in 1915, and the manufacture of this apparatus had its beginnings in 1917. Its de velopment into the present design has been a steady progression since then. So remarkable have been the results obtained in the use of saem that in this short time its reputation has taken on an international scope.

Thomas C. McBride, the Worthington Inventor

In making the above reference to the evolution of this heater under the sponsorship of Mr. McBride, with the great savings in fuel and water made possible thereby, it might be of interest to mention another outstanding benefit that locomotive owners have derived from its use. One of the most expensive and annoying troubles encountered in the operation of locomotives is pitting and corrosion of the boiler tubes. A major cause of this that has prevailed generally everywhere, has been found to be the production of electric currents between adjacent points on tube surfaces that are in contact with water. These currents are present even where there exists only a slight difference in the composition of the metal at those points. The flow of these currents releases what are known as "hydrogen ions," which carry off into solution with the water tiny particles of iron. A peculiarity of this action is that the water can absorb only an infinitesimally small quantity of these ionized particles, so that the solution quickly reaches a saturated condition, the electric currents become neutralized and further action ceases. By allowing air to enter with fresh feed water, the oxygen contained in the air immediately attacks and oxidizes the iron in solution, and this starts the cycles of activity all over again. It has been conclusively proven that these continue so long as air is admitted into the water space of the boiler.

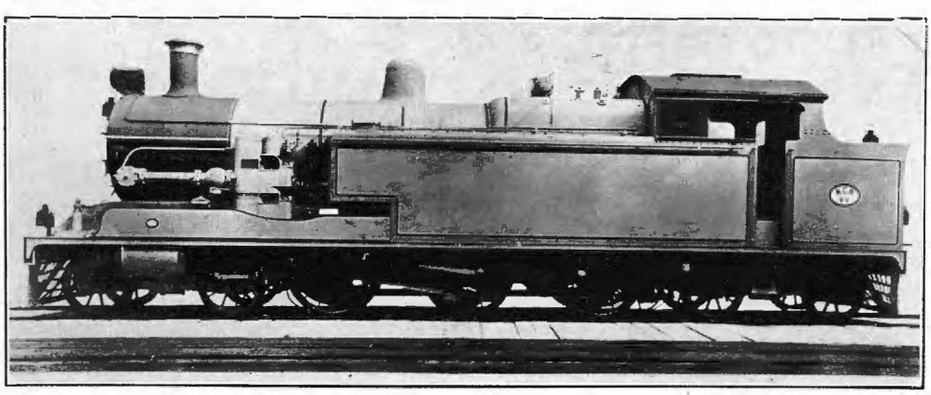
In designing the Worthington Heater this important matter was given careful consideration, and means were provided whereby more than 85 per cent. of the air that is normally in solution with all raw water is entirely separated and does not enter the boiler. As all of the exhaust steam used to heat the water in the Worthington open heater goes directly into the water fed to the boiler, the percentage of air present is thus further reduced to probably not more than 10 per cent. of that present in the feed water delivered by any other type of heater or injector.

In discussing this subject an experienced American engineer who for several years has made a close study of these conditions, states as follows :—

"The proof is complete when we find that the presence of an open feed water heater which nearly eliminates oxygen is sufficient to practically stop pitting in stationary boilers. Feed water heaters for locomotives are new in the world, but they are in successful use, and some of them are of the open type, so that the oxygen can escape while the water is being heated."

A number of mechanical and electrical devices and methods of water treatment have been tried out in an effort to counter-act this oxidation by the air taken in with the feed water, but all these have proven bothersome and expensive to install and to maintain. It has been found that the most practical method is to prevent the air from entering the boiler with the feed water in the first place. This the Worthington open locomotive feed water heater does automatically with no cost or bother either for extra equipment or for maintenance.

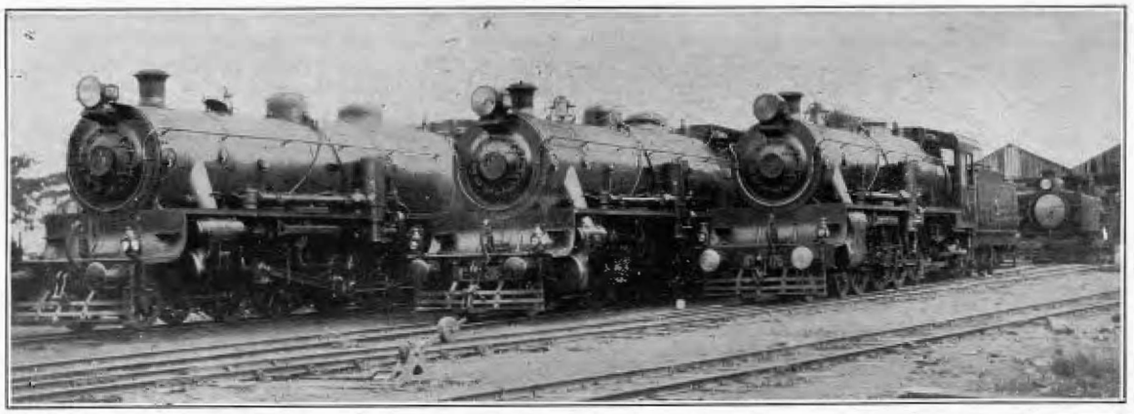
For many years Worthington had been manufacturers of closed feed water heaters for stationary service. In power plants where the heating of feed water was practiced the closed heater was in universal use. To-day but few of these can be found in use anywhere and concerns who made them have either gone out of business or have ceased their manufacture. Worthington was among the first to bring out a stationary heater of the open type.



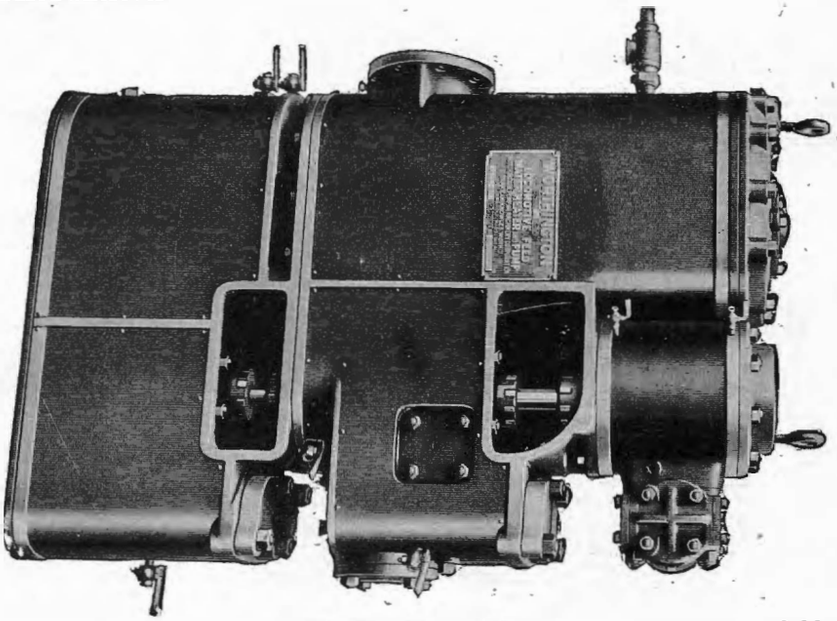
Hongkong Railway, Canton-Kowloon Section, Locomotive K.C.R., B.S. Equipped with Worthington No. 2B Locomotive Boiler Feed Pump and Feed Water Heater (Heater Blake Built)

It was the consideration of the above circumstances, among others, that induced Worthington engineers when designing the Worthington locomotive feed water heater, to discard the closed

type and to adopt the open type of construction exclusively. The immediate recognition by railway engineers of the possibilities possessed by the open type of heater for locomotive work has been fully justified by the wonderful results that have been realized wherever



Manila Railways Company Locomotives Nos. 173, 206 and 175 Equipped with Worthington Locomotive Feed Water Heater and Pump of 32,500 lbs. per Hour (65 gals. per min.) Capacity Photo Taken at Manila, P. I.



The Worthington Heater

these Worthington heaters have been installed.

The rapidity with which the use of the Worthington open Heater has spread all over the world, and the fact that already thousands have been adopted by the most important railway system in all the principal countries of Europe, Asia, South America and South Africa, as well as on practically all the larger railways in the United States, Canada and Mexico, as standard and indispensable units of locomotive equipment, are marked tributes not only to the genius of the inventor who is the subject of this article, but they are also conclusive proof of the many exceptional merits of excellence that are inherent in this apparatus.

Bristol Ports Abolish Far East Freight Surcharge

The abolition of surcharge from Newport and Swansea to Far Eastern Ports has been officially notified by the Secretary of the South Wales and Monmouthshire Iron and Steel Manufacturers Association as from February 1, as a result of negotiations conducted by a committee representing the employers' associations of the South Wales iron and steel and tinplates trades and Chambers of Commerce, in association with the Great Western Railway.

It is considered that as nearly one-half of the total iron and steel exports from Great Britain to the Far East are dealt with at Bristol Channel ports, the concession will be one of prime importance to South Wales manufacturers in one of their foremost markets. The South Wales manufacturers have hitherto had to pay a surcharge of 5s. ($1.25 U.S.) on traffic loaded at the ports named or incur the expense of heavy railway carriage to the River Mersey. Freights from Newport and Swansea to the principal markets are now on the same basis as London, Liverpool, Glasgow, and Middlesbrough.

Largest Turbines for Export Ordered by Japan

Two 43,750 kv-a., 50,000 shaft horse-power, steam turbine generators, the largest complete units ever built for export, have been ordered by the Hayakawa Electric Power Co., of Japan from the International General Electric Company, U.S.A. The installation, to be made at a cost of approximately two million dollars, will be used in parallel with the hydro-electric developments of the company in the hamamatsu district for furnishing power to Tokyo. The average consumption of electricity in Japan for the lighting of homes is about 35 watts; these huge generators are capable, therefore, of lighting about two million homes. It is in the rapidly developing industrial field, however, that the major part of the power will be used.

The size of the turbines can be appreciated from the fact that the rotors weigh 60 tons each, and are 30-ft. long and four feet in diameter. Each turbine has a net weight of 785,000 pounds. Except for the rotors, the apparatus will be shipped disassembled, making the journey from Schenectady *via* the Panama Canal. Shipment of the first unit will be made this summer. The second unit will be shipped early in 1926.

The turbines will produce energy at a 11,000 volts and 50 cycles. The order also includes two 1,000 kw., 3,300 volt, 50 cycle house turbines. The equipment is to be installed in a new power station the Hayakawa Co. is building at Kawasaki, to the south of Tokyo.

The order for the equipment was received by the Tokyo office of the International General Electric Company through Mitsui and Company. The Hayakawa Electric Power Company is a subsidiary of the Toho Electric Power Company, which in turn has a controlling interest in the Daido Electric Power Company, one of the most important power amalgamations in Japan.

A year ago, the Toho company ordered from the International General Electric Company a similar turbine, but rated at 60 cycles rather than 50, for installation in Nagoya, in the south of Japan. That order established the record for export turbines, but has been surpassed in physical dimensions by the new order.

Another order received recently from Japan by the International General Electric Company from Mitsui & Company is for three vertical water-wheel driven generators, the order having been placed for the Gifu Electric Company. The generators are rated at 10,125 kv-a., 6,600 volts, and will have direct connected exciters. The order also includes a two unit, three bearing, motor generator set, seven 5,000 kv-a., 60 cycle, water-cooled transformers, and a 17-panel switchboard.

The Soya Bean in Manchuria

By Taro Ito of the Manchuria Railways Co.

A Paper Read at the Pan-Pacific Food Conservation Conference

AS all of you know, the soya bean has constituted an important foodstuff in China for the past 5,000 years. China boasts of the foremost position of the present-day world in the production of soya beans. Eighty per cent. of the world production is cropped in China at the present time and 70 per cent. of China's yield is produced in Manchuria.

Manchuria, therefore, ranks first in so far as soya bean production is concerned. Her annual yield is estimated at approximately 3,500,000 kilolitres.

These large figures are results brought about by the rapid development of recent years and this development is in turn due to the effort on the part of the Manchurian farmers as well as activities on the part of railroad authorities. Although the soya bean of Manchuria has now risen to the place of a world commodity, yet it was not until 1908 that Manchuria soya beans were introduced to the world market. In that year the first shipment was made to England; and ever since that time their utility has come to be recognized by European and American people, and they are annually exported either in the shape of oil and cakes or in the shape of beans. The soya bean has attained the position of being the most important agricultural product in Manchuria to-day, and it is by no means exaggeration to say that business circles depend to the greatest extent upon the market situation of this commodity.

South Manchuria Railway's Experimented Bean Mill

However, the Manchurian beans are not so important as such, as they are as the raw material for oil and bean-cake. The greater proportion of the soya-bean crop is consumed in oil factories for the manufacturing of oil and cake, while a lesser proportion is exported to China proper, Japan and other foreign countries, such as England, Germany, Holland and Egypt on the one hand, and America on the other.

The quantities of soya beans carried by the South Manchuria Railway alone amounted to 2,000,000 metric tons for the year 1923. Of this tonnage 400,000 tons were exported to Japan, 150,000 tons to China proper, 80,000 tons to the South Sea Islands and Australia and 1,000 tons to America, chiefly to the port of Seattle, in the Pacific area, and 120,000 tons to Europe and Africa. The aggregate of exports amounts to 750,000 metric tons for the last year. That is, something like 37 per cent. of the beans which entered into the railroad traffic were shipped by steamers from Dairen, the southern terminal of the railorad.

Then, what became of the remaining 63 per cent.—or 1,250,000 tons? They were consumed in oil factories called by the Manchurians "Yu-Fang"; factories which flourish in Dairen and Yingkou, for the manufacture of oil and cakes. The export of oil reached 140,000 metric tons for the year 1923 and that of bean-cake 1,300,000 tons, the oil being exported mainly to Europe and America and the cake to Japan for fertilizer.

As well be gathered from the foregoing sketch, the transportation of soya beans occupies a significant position in the railroad traffic in Manchurian regions.

As peculiar to the method of transporting soya beans now in force on the South Manchuria railway (also on the Chinese Eastern railway, in so far as through traffic to the South Manchuria railway is concerned) attention must be called to the "mixed storage system" which is combined with the carriage. Not only has improvement in handling soya beans been effected but improvement of quality has also, through this system, been encouraged and at the same time merchandising has been facilitated. This system is not at all compulsory and those who do not desire to avail themselves of it can make shipments on the ordinary basis of transportation. But, in reality, the soya bean business derives many advantages and much benefit from the system, especially at a time of congestion of

The Business Street in Mukden

Mukden Railway Station

traffic. Ninety per cent. of the carload shipments utilize the system.

What is, then, the character of this mixed storage system and what functions does it play in the sphere of railroad transportation?

Mixed Storage System Now in Operation on Railroads

Merchants who are desirous of shipping their beans by rail from one place to another, some for the purpose of discharging their contracts, others for the purpose of supplying their mills with beans purchased for their plants at distant markets, can bring them in bags to specific depots designated as points of acceptance for carriage on the mixed storage basis and there offer them as mixed storage railroad freight. The quantity of one consignment is fixed at carload shipment—that is, about 30 tons, otherwise they cannot be accepted.

Acres of Bean Cake stored in the Open on Dairen Wharves

Previous to the acceptance the beans thus delivered are examined and graded by railroad agents appointed specially for this purpose, according to standards selected for the year. In addition to the examination and grading of contents, the containers (all of them are gunny-bags) are similarly examined and graded in accordance with the standards fixed for the year. In case the beans offered in this manner come up to the standard and the bags pass examination, they are accepted for storage with transportation. Depositors, who, in a sense, may be called consignors, are entitled to certificates issued on demand, which may circulate legally as negotiable paper. After an interval of a week, reckoning from the day on which the certificates were issued, the bearers of the certificates are entitled on demand to withdraw an equivalent amount of beans of the same quality from the specific depots to which the first depositor has made assignment. But, if they desire to change the depot at the time of the consignment to another, from which they had intended to draw, they are allowed with some restrictions to do so.

Through this system, even when congestion of traffic is experienced, the railroad can operate its rolling stock smoothly and efficiently, by taking into consideration the situation of delivery and withdrawals of beans over all its lines and appropriately adjusting their transportation to meet requirements of any of the depots, irrespective of the specific destinations designated in the consignment papers. This benefits not only the railroad but also consignors and consignees, because carriage will not be refused on the plea that traffic is too congested.

Through this system, improvement in quality of beans is believed to have been achieved. Examiners are vested with the right to determine whether the quality of beans is equal to the standards or not, and the beans which do not come up to the mark do not enjoy the benefit of the system, with the result that merchants do not care to purchase such inferior beans and accordingly farmers pay keen attention to producing beans of superior quality.

Besides these merits the mixed storage system is said to have another beneficial point. Regardless of the real carriage of any particular beans which are entrusted to the railroads, the bearers of certificates are given the right to make withdrawals after the lapse of a certain period of time. For this reason they are able easily to negotiate the papers with banks.

The "mixed storage system," as the railroad authorities call it, was adopted in 1919, by the South Manchuria Railway. Later, in 1922, an agreement was made relating to the through traffic in soya beans accepted on the mixed storage basis between the South Manchuria Railway and the Chinese Eastern Railway.

In view of the economic situation of Manchuria, the South Manchuria Railway donates a bounty of 15 yen per consignment, that is, per carload, and by this means and others is endeavoring to improve the bean trade in its territory.

Examiners. Contrary to that of other countries, the system adopted by the South Manchurian Railway is peculiar in respect to the examiners. Thus in Canada and the United States the examination and grading of grain are usually undertaken by officially organized boards or committees. However, the examination and grading is done on the South Manchurian Railway by examiners appointed by the company. Their qualifications are in like manner determined by the company, which undertakes not merely the responsibility of carrying but also of examining and grading.

Examination and Grading of Soya Beans and Bags. The examination of beans is ordinarily carried on in the railroad yards by drawing a certain number of samples from one consignment which comprises 350 bags, each bag weighing not less than about 85.2 klgs. (142 kins). The method now in use is practical, based upon the appearance of the beans to the naked eye and their moisture content as estimated by chewing between the teeth. The authorities have under consideration the introduction of a more scientific method by which all the complaints arising from the examination and grading will be eliminated.

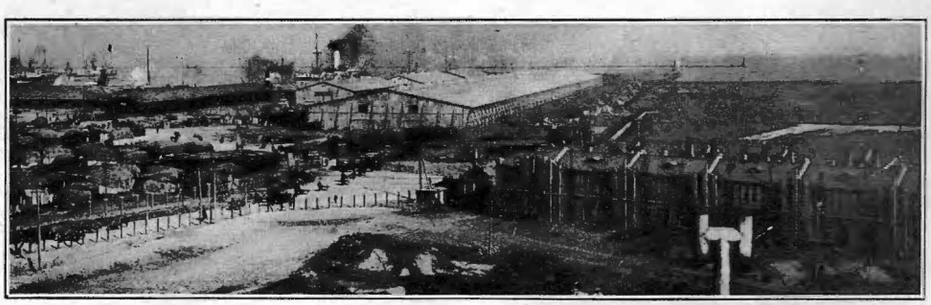
The standards are fixed at a certain time of the year annually by experts in agriculture at the agricultural experimental station of the company, who collect beans from different parts of Manchuria and take into consideration many conditions necessary to the standardization. The standards now in operation have three grades, A.B.C. Beans which come below C are not to be accepted as freight under the mixed storage system. So far for the beans. I will now give an outline of the examination and grading of bags. Bags used as containers of soya beans are gunny-bags, mostly imported from India—needless to say, some are imported from Japan. The annual import reaches 20,000,000 bags on the average, comprising, of course, old ones as well as new.

The bags in which beans are packed are examined and graded together with the beans. The standards thereof are also three. A new one is designated as A and old one used only once is designated as B, while an old one used twice is designated as C.

The railroad can make delivery of different grades of bags so long as it delivers beans of the same quality as it had accepted. The difference between the prices of superior and inferior grades of bags is paid or received by the company as the case may be.

Method of Packing Soya Beans and the Projected Elevator System. Soya beans are at present carried in Manchuria in gunny-bags and, as the weather in Manchuria in winter when the beans appear on the markets is dry, any precipitation falling as snow, open stacking is permissible without the slightest damage to the goods. But in view of the saving of time in handling the goods, as well as of economising the expenditure on bags the South Manchuria Railway is now considering the construction of grain elevators in the interior as well as terminals, as, for instance, in Dairen and Changchun.

This plan will be realized next year and building will be started.



Small Part of Dairen Wharves showing Warehouses and Open Storage

Pericle A. Chieri

The Far Eastern Review

Reconstruction Number

June-July, 1925

A Monument To The Japanese Engineer

The Reconstruction of

Tokio

and

Yokohama

M.S.

The Far Eastern Review

ENGINEERING FINANCE COMMERCE

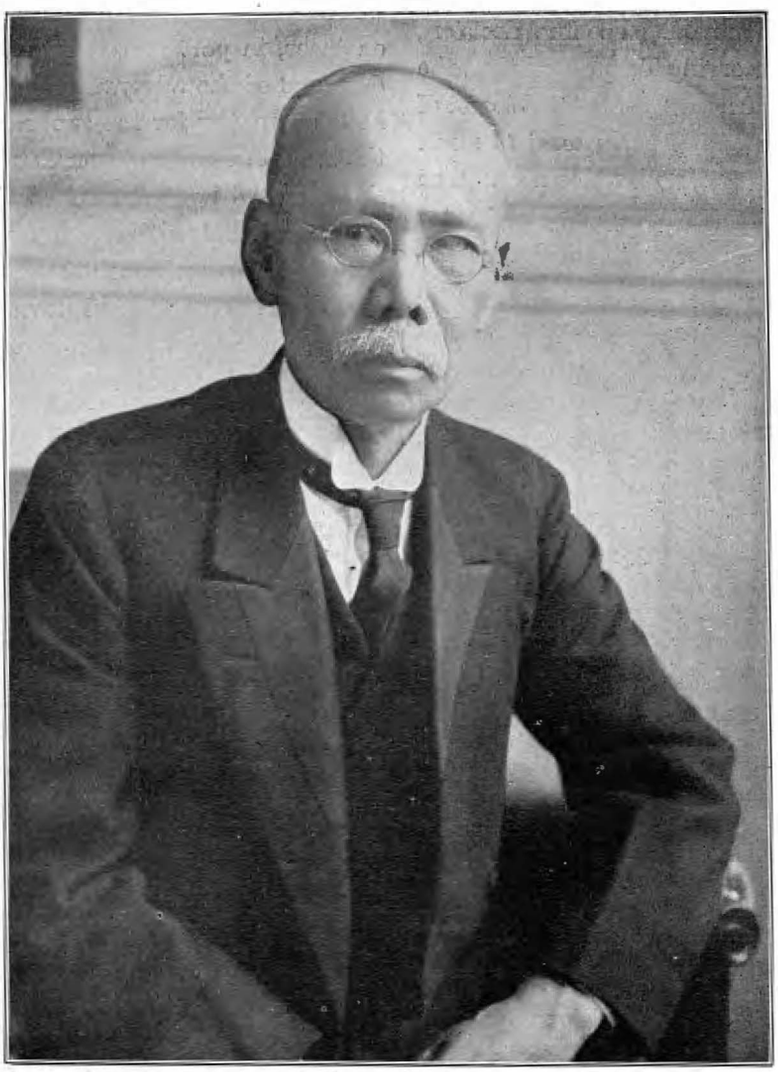
VOL. XXI SHANGHAI, JUNE-JULY, 1925 No. 6-7

A Monument to the Japanese Engineer

THE FAR EASTERN REVIEW dedicates this number to the Japanese engineer, whose monument will ever be the recreation of Tokyo and Yokohama after the terrible earthquake and fires had reduced these cities to veritable dust. The casual person little realizes what it means for a city to disappear and then again to arise out of its ashes. When news of the earthquake flashed across the cable wires to all countries universal sympathy for the Japanese people was engendered. Every nation tried to do its share in rushing assistance to the suffering. The United States was particularly generous in its exhibitions of friendship. Even China, which for years previously had only remembered the political differences between the two countries, was now impelled to show that in distress all peoples of the world are brothers.

After the first flush of the shock of the disaster other peoples quite naturally settled down to their own affairs, and Japan was left with the problem of re-making her capital and her principal commercial port. It was to be a work from the foundations up. What the earthquake and subsequent fires actually did to Tokyo and Yokohama few who were not there at the time can imagine. An eye-witness's account,* written shortly after the event, describes graphically what happened:

"On Monday we took a trip through the heart of Tokyo. Where shall one begin his description? Shall it be the electric wires entangled overhead, torn loose, covering the streets? Shall it be the overpowering odor of burning humanity? Shall it be the buildings, now heaps of broken stone and wood, still smouldering, still smoking? Shall it be the gaping crowds, or those picking in the *débris* for the bodies of lost ones? Perhaps it is not possible to find words to describe these scenes. Perhaps we may pass over the havoc with just one sentence: the heart of Tokyo was gone, nothing was left but a few modern buildings. . . . ."



The Reconstruction Mayor of Tokyo

MR. ZEKO NAKAMURA

One of Japan's Ablest Executives

From a minor post in the Formosan Government Service, Mr. Nakamura rose to the Presidency of the South Manchuria Railway Company, which post he held for five years during its formative period (1908-13); from there he was called to the vice-Presidency and then to the Presidency of the Imperial Japanese Railways. On the retirement of Mr. Nagata as Mayor of Tokyo, Mr. Nakamura was selected to fill this difficult position during the Reconstruction Period.

*"Diary of a Fortnight," by George E. Sokolsky in the *North-China Daily News*.

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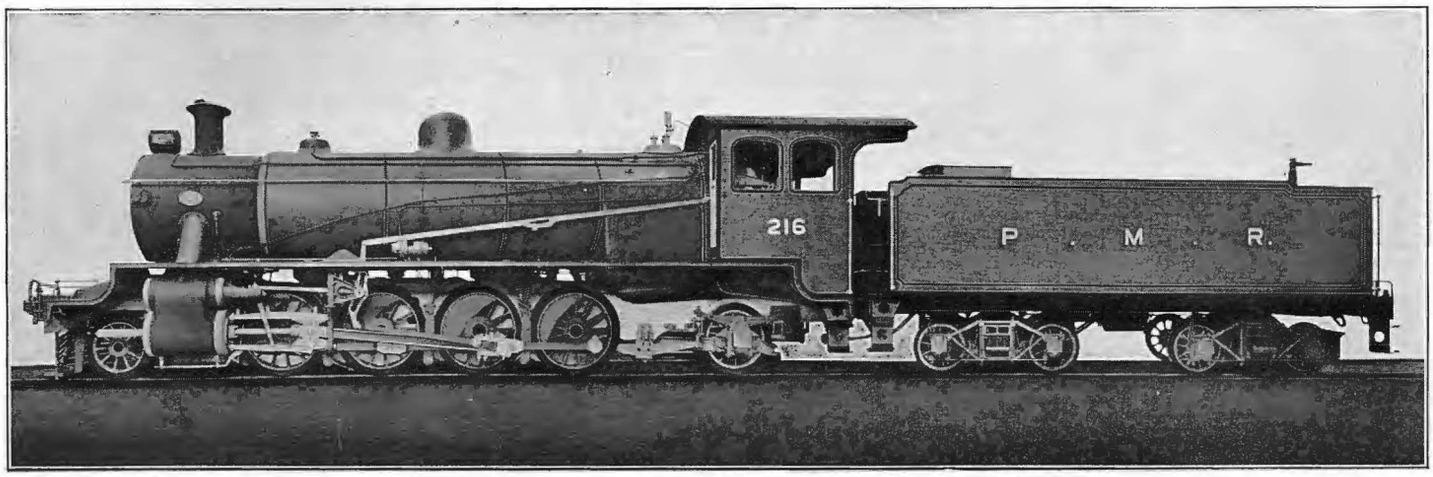

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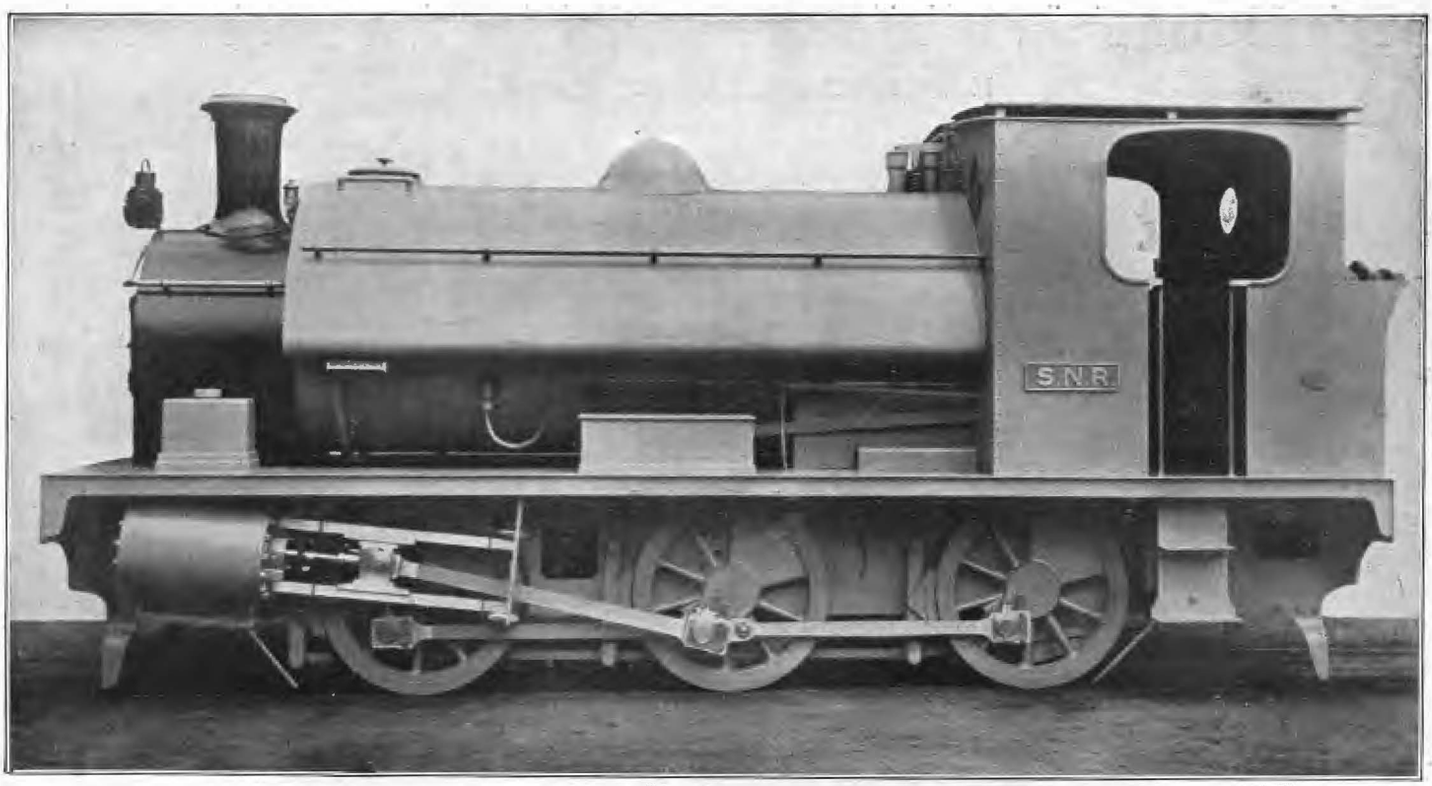

AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

Harry Gyro — p. 553

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

MAY 30

MANCHURIA—A SURVEY

RED JOURNALISM

STRIKE ECONOMIC, THEN POLITICAL, NOW ECONOMIC AGAIN

HOKKAIDO, THE DIFFIDENT

A STUDY IN EXTRATERRITORIALITY

COAL IN THE PHILIPPINES

JAPAN'S PLACE IN THE RACE FOR AIR SUPREMACY

JAPAN'S CONTRIBUTION TO NAVAL ARCHITECTURE

ZINC METALLURGY IN TONKIN

EASTERN STEEL MARKETS

DIRECT-CURRENT LOCOMOTIVES FOR YOSHINO RAILWAY

CAPITAL DAM OF THE CHENGTU PLAIN IRRIGATION

Vol. XXI August, 1925 No. 8

SHANGHAI, PEKING, TOKYO AND MANILA

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遠東時報

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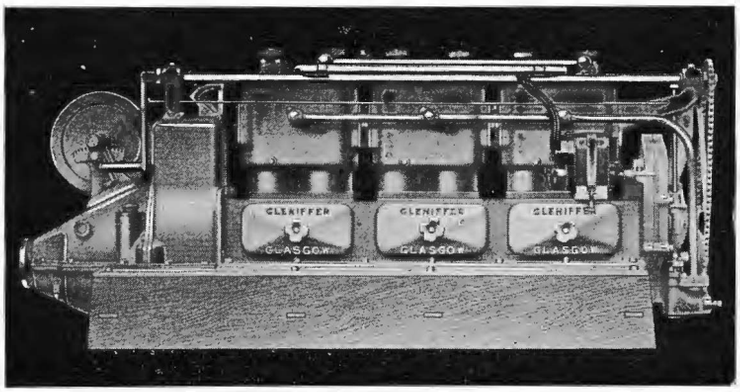

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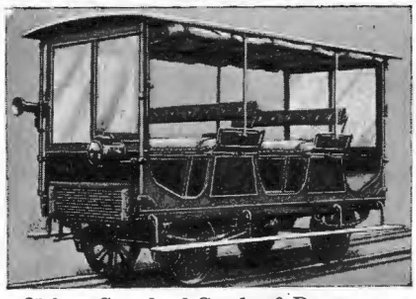

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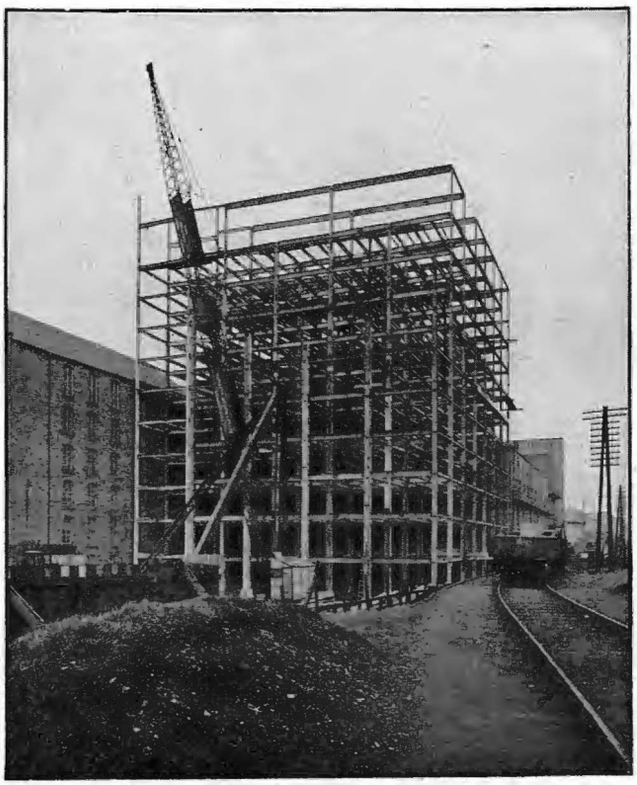

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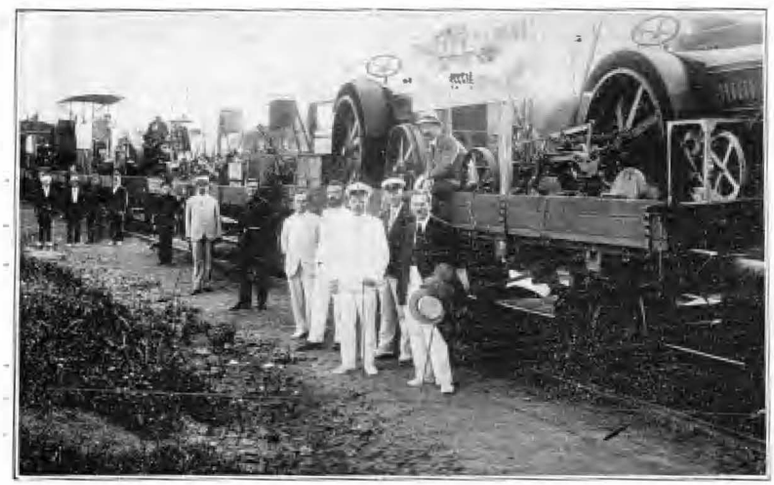


American Tractors Loaded on C.E.R. Flat Car for Direct Shipment to Russia

Looping the Loop on the Western Section of the Chinese Eastern Railway

A Study in Extraterritoriality

By E. Lennox Simpson

THERE was something dramatic about Boris Ostroumoff's arrest at the Chinese Eastern Railway's offices on October 3, 1924, the day the Soviet took over the management of the railway, and there is certainly something more tragic in his illegal solitary confinement in a Chinese prison for eight long months. This is undoubtedly the most important case in which foreigners are the defendants that has ever been brought before the Chinese Courts of Justice.

Ostroumoff, the selection of the Russo-Asiatic Bank, held the position of General Manager of the Chinese Eastern Railway for close on four years, whilst his co-defendants are Gondatti, ex-chief of the Chinese Eastern Railway Land Department and formerly Governor-General of the Priamur, Mihailoff, ex-chief of the Economic Department and formerly Minister of Finance at Omsk under the Koltchak Government, and Stepunin, ex-chief accountant, formerly chief bookkeeper of the Russo-Asiatic Bank.

Before touching on other matters it is necessary first to explain about the Courts of Justice in the Special Railway Area. They are directly under the Ministry of Justice at Peking, and it is Peking who has to look after their maintenance, as with other courts of justice throughout China. Nominally they are quite independent of the local provincial government. Actually, Peking is unable to supply the funds that are needed, so that salaries are in arrears for months, and the officials badly paid, causing not only the dignity of the court to suffer, but also irregular and illegal practices on the part of the court officers, who charge imaginary fees for any little thing done for the public. It is the system and not the officials which must be blamed. In the second place, the provincial authorities have a great deal to say, insisting that the higher court official appointments be approved by them first, which means to say that these officials become morally subservient to the provincial authorities. These are two fundamental defects in the Chinese judicial system at present.

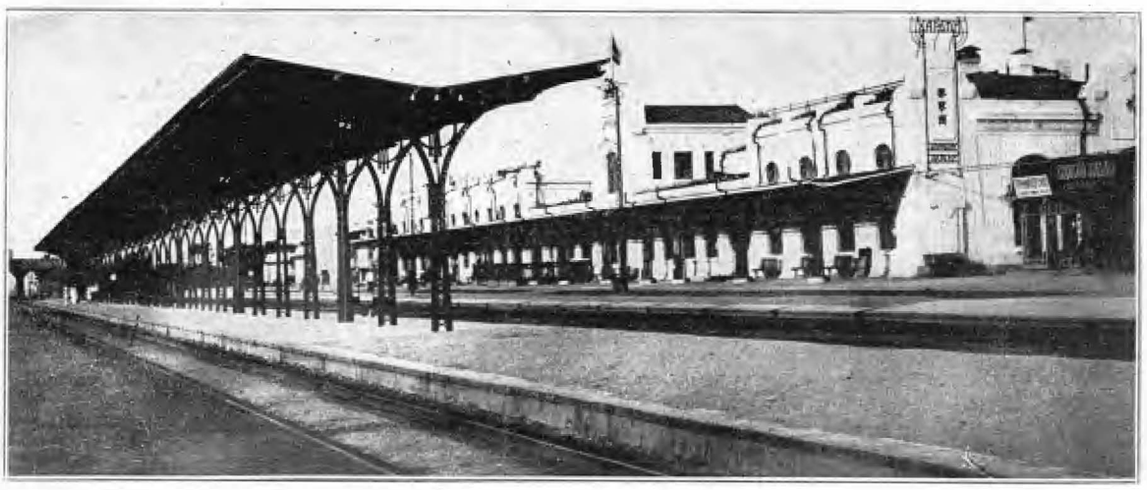
Administration Offices of the Chinese Eastern Railway, Harbin

In the Ostroumoff case we find that the Investigating Judge, as soon as he was appointed to preside over the trial, obtained ten days' leave to go to Peking to see his sick mother, and never returned, no doubt shirking the responsibility. He was succeeded by a Peking judge, who never took up his post, two local judges succeeding each other but never getting further than wading partly through the nine volumes of material and documents, the case being finally turned over to the present judge. The latter is a very

young man, not yet thirty years of age, and therefore without much experience.

At the opening hearing of the trial, which was on June 3, exactly eight months from the date of arrest, all the lawyers for the defence—five of the leading Russian lawyers and all men of experience—protested against the hearing of the case, asking that the accused should be discharged by virtue of the Amnesty Mandate of the Chief Executive. This was over-ruled owing to the order of Marshal Chang Tso-lin, who decreed that three classes of prisoners in the Special Area should not benefit by the Amnesty, and Ostroumoff and his colleagues were included in the third classification. Counsel then proceeded to show the Court that none of the accused were Government officials, and that Marshal Chang's order only applied to Government officials. Documentary evidence was furnished that Ostroumoff received his appointment from the Russo-Asiatic Bank, which was confirmed by the Directors of the Railway, and had nothing to do with the Chinese Government; also that the Chinese Eastern Railway was purely a Government enterprise. This had no effect on the judge, who stated he would proceed with the case. Another point brought up was that, according to Chinese law, the court may keep prisoners in custody without presenting an accusation for six months only. If in six months no indictment is drawn against the person in question he should be released. In the case of Ostroumoff this law has been transgressed, and, however peculiar it may be, the judicial authorities, when making up the total of the term, left out the time they spent in clearing up the question whether the amnesty was to be applied to Ostroumoff or not. Thus it has come about that the accused had spent eight months in prison instead of the prescribed six months before the trial came on.

From a foreign point of view, the discharging of the accused is so incontestable that the non-performance of it may become tantamount to a denial in principle of all the bases of the forms of law proceedings, so far as these constitute guarantees of rights. Then, again, the question of formalities in the case is of great significance in judging of the nature of judicial activity itself. Though the trial is a long, long way from being over at the time of publishing this article (the begining of Aug.) one cannot fail to see that the executive authorities in Manchuria are imparting a quality of pressure to the decisions of the court.

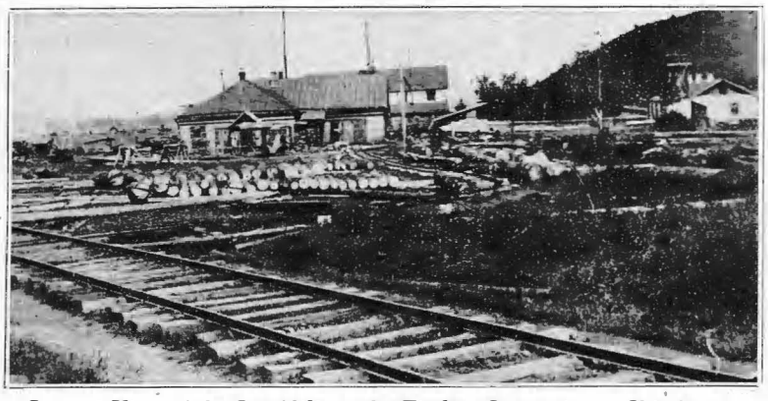


Harbin Railway Station

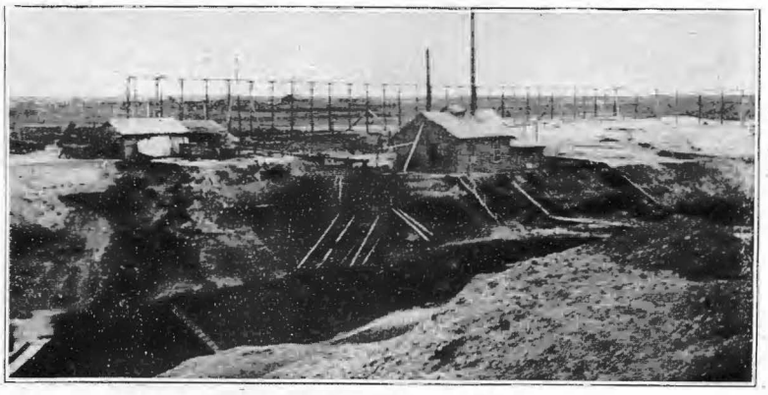
On the second day of the hearing Ostroumoff read a telegram which had been sent by the President of the Chinese Eastern Railway to the Administrator of the Special Railway Area, General Chu, stating that the arrest of the accused was based on the request of the Russian (Soviet) authorities, and goes on to say that the Chinese Eastern Railway Directors should present documentary evidence against the accused in order to observe the law, urging the receiver of the telegram to see that what was necessary was carried out in order that there should be no protests from diplomatic circles. This telegram produced a sensation in court when read, and much surprise was evinced that it should be among the documents that the prosecuting attorney has attached to the accusatory act. The producing of this telegram in court has strengthened the conviction that many people hold, that the case against Ostroumoff is more of a political than a criminal nature. This conviction becomes stronger and stronger as the case proceeds, on account of the attitude taken by the presiding judge and the arbitrary actions he resorts to. Times out of number the counsel for the defence rise and protest against one and another thing, but without success. The prosecutor has presented no direct evidence against the accused from the Board of Directors; therefore Ostroumoff rightly argued he should be discharged, seeing that his employers were the Directors and that the vague accusations by other people, some actually not in railway employ, cannot be taken seriously by the court.

Boris Ostroumoff, ex-General Manager, C.E.R.

(Continued on page 557.)



General View of the Saw Mills at the Timber Concession at Shitahotze



The C.E.R. Coal Mines at Jelainor

Just what will be found in the unknown Arctic territory cannot possibly be foretold, but prominent scientists are of the opinion that a large continent is located there. Should this be true, the value of such a continent is problematical, but that it will have a tremendous value as an air base for a Trans-Arctic air route is a foregone conclusion.

When discussing the future of a Trans-Arctic air route, it must always be remembered that there is permanent daylight in the Arctic regions between May and September and that the temperature during that period averages from 40 to 44 degrees F. The supposed extreme cold exists only during the winter months, and during the summer the atmospheric conditions for flying are ideal.

While the plans of the expedition so far have been limited to a flight from Spitzbergen to Alaska, I am now endeavoring to make arrangements to secure the additional equipment necessary in order to make a flight from Spitzbergen to Japan with Alaska as the one and only stop for refueling.

The duration of such a flight would be about 36 flying hours and should be accomplished within a period of two or three days. Such an attempt should command the keenest interest in this country.

The distance to be flown would be about 3,400 miles, not much longer than the distance across the American continent from New York to San Francisco. The distance is no obstacle, and after the flight has been made once and the condition of the territory becomes known, it should be simple to operate a regular Trans-Arctic air route during the four or five summer months.

No other country will benefit nearly as much from such a Trans-Arctic air route as will Japan. Such a route will shorten the distance between Japan and Europe by several thousand miles. It would bring London to within a three-days' distance of Tokyo. A visit to Europe and return could comfortably be made in from one to two weeks. From this it will be seen that the opening of a Trans-Arctic air route would not only be of immense strategical but also commercial importance to Japan.

The Trans-Polar Flight expedition is not a national undertaking, but a strictly international effort for the purpose of geographic exploration. That its results, if successful, should develop into a regular Trans-Arctic air route would simply be a natural trend of the progress and development of the world.

A Study in Extraterritoriality

(*Continued from page 547*).

Ostroumoff and his colleagues, when giving their evidence, denied all the accusations brought against them, and handed the court numerous copies of documents to prove the statements they had made. And this, though so far they have been denied the right to have access to the archives of the Railway Administration to get hold of original documents that are most important for the defence.

The case is a long way from being over, though ten hearings have taken place, for apparently the presiding judge is bent on drawing the case out as long as possible. The sessions are short, never more than three hours, and often much less, whilst they do not take place daily, it taking exactly one month to hold the ten sessions. Another difficulty is that the prosecuting attorney may at any time make additions to his accusatory act. This means further delay, for the production of new documentary evidence on the part of the prosecution will mean that the defence will require time to study these in order to give an intelligent reply.

When Ostroumoff took over the railroad he founded the Economic Bureau to institute an organization for compiling the necessary basic information for the planning of the railway's work. He at once introduced a new tariff policy on the railway, reducing the former tariff rates, which were absurdly high, and enabling native carts to compete successfully with the railway on the southern section, and also to create new transportable commodities by taking advantage of the economic resources of the country.

The following figures show the growth of the commercial transportation :

1920	102,286,613 poods
1921	126,149,526 ,,
1922	151,605,404 ,,
1923	171,153,044 ,,

Extraordinary efforts were needed for getting the rolling stock in good order again. The following table shows the improvement brought about :

	Locomotives		Passenger Coaches		Goods Cars	
	1921	1924	1921	1924	1921	1924
In service and reserve ..	256	181	178	252	9,667	7,208
	97	280	57	206	—	4,348
In bad order ..	152	72	278	153	2,536	647
Percentage of bad order stock to effective number	30.3	13.5	54.00	25.00	20.8	5.3

In the Traffic Department the following improvements were made. The commercial speed of freight trains was increased from 12.78 versts an hour in 1920 to 17.10 versts in 1923, and the commercial speed of passenger trains from 21.75 versts an hour in 1920 to 33.36 versts in 1923, whilst passenger trains obtained a maximum speed of 77 versts an hour in 1923 against 65 versts in 1920. There was likewise a great increase of the make-up and weight of trains. The average make-up of 67.5 axles in 1920 was increased to 100 axles in 1923, whilst the maximum weight of trains of 60,000 poods in 1920 was raised to 115,000 poods in 1923. At the same time traffic department expenses were reduced from $4\frac{3}{4}$ millions in 1920 to $2\frac{1}{2}$ millions in 1923.

The property of the Railway, which is looked after by the Maintenance of Way and Works Department and which includes the track, different buildings and construction, and open yards, fell into a state of complete decay during the war and civil commotion. The total length of the railway is 1618.4 versts of main line, and with inclusion of sidings 2,702.8 versts. A space more than 200,000 square sagens (a sq. sagen equals 49 sq. feet) is covered by civil constructions, representing 125 sq. sagens per one verst of track. No other railway in the world possesses such a number of civil constructions. During the three years 1921 to 1923 the Ways and Works Department has not only effected repairs and restored all essential elements of the track, whereby it has been possible to raise the speed of trains to 77-80 versts an hour, but it likewise repaired all damaged buildings and accomplished a number of new works involving a sum of over six millions; the signalling equipment has been improved, wooden bridges replaced by bridges of a permanent type, and car-sheds and other large-size buildings have been erected.

Japan Competes for India's Textile Trade

Indian trade statistics for the eleven months ended February 1925 have just been published. They show that the imports of cloth from the United Kingdom (grey, bleached, and colored) amounted to 1,449,000,000 yards, an increase on the corresponding eleven months of the previous year of 265,000,000 yards. During the same period the cloth imports from Japan were 138,000,000 yards, an increase of 26,000,000 yards. These figures show that the increased trade done by Great Britain with India in cloth was nearly twice as much as Japan's total cloth trade with that country. With regard to yarns, however, Japan has undoubtedly made a good deal of headway. She has exported to India over 30,000,000 lbs., in comparison with 19,000,000 lbs., whereas the United Kingdom has sent only 19,000,000 lbs., as against 20,000,000 lbs. in the corresponding period of last year. The main cause of this is Lancashire's higher cost of production.

New Shallow Draught Oil Tanker for Chinese Trade

A very interesting launching during the month was that of the *Tien Kwang*, which vessel Messrs. Yarrow & Co. have built for the Anglo-Saxon Petroleum Company, for service of that concern on one of the great rivers in China.

The vessel is a sister ship to the *Shu Kwang*, also built by Messrs. Yarrow for the same owners. They are shallow river oil tankers of about 206-ft. long and fitted with machinery of 3,500 horsepower. They are also fitted with the latest type of Yarrow oil-burning boilers. Formerly it was usual to send vessels of this type in sections to their destination to be re-erected there, but the *Shu Kwang* was sent to the Far East under her own steam, and the *Tien Kwang* will shortly be ready to leave the Clyde for China, and will also come out under her own steam.

Jap. Boat with Lubber-Deck

Pericle A. Chieri

p. 603

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

上海仁記路拾六號

遠東時報

TARIFF AUTONOMY FOR CHINA

UNIFICATION OF ADMINISTRATIVE CONTROL OF THE RAILROADS OF CHINA

CAN EXTRATERRITORIALITY BE ABOLISHED IN CHINA

MR. BYWATER'S FRIGHTFULNESS

THE DEVELOPMENT OF THE PORT OF DAIREN

PETROLEUM IN THE PHILIPPINES

PETROLEUM IN WEST CHINA

LUNGHAI RAILWAY EASTERN EXTENSION

HISTORY OF BAMBOO STEEL

Vol. XXI | September, 1925 | No. 9

A. L. TAYLER

Unification of Administrative Control of the Railroads of China

By H. E. Yeh Kung-cho, Minister of Communications of the Republic of China

[*The following memorandum was presented to the Chief Executive of the Republic of China by the Minister of Communications, H. E. Yeh Kung-cho. It is to be hoped that Mr. Yeh will have an opportunity to carry out his plans.*—ED.].

Too much emphasis cannot be placed on the importance of development of the means of communications. On it depends the life of modern civilization. It is the forerunner of political, economic, financial and industrial progress. Military organizations depend upon it for mobility and immediacy of information. To accomplish these, a well settled policy should be adopted. In accordance with the various conditions obtaining in different countries, the policies adopted in various parts of the world to answer their respective requirements may be divided into three classifications. They are (1) Indirect Production Policy. To help agricultural and industrial development by means of communications. (2) Direct Production Policy. Communication systems are made to yield revenue for the benefit of the national treasury. (3) Relative Production Policy. A combination of the above two policies, aiming at agricultural, industrial and economical development of the country as well as the gain to national treasury.

In view of the poverty of the government, on the one hand, and the backwardness of our industries and commerce, on the other, the Relative Productive Policy is, therefore, the most suitable for China. Both the Government and popular interests can not be overlooked. But it is one thing to have a good policy and another to put it into effect. Suitable guidance and existence of proper conditions are essential to the successful execution of any policy. An effective policy for the development of communication systems requires Unification of Administrative Control.

China has completed only 6,000 miles of railways, 80,000 miles of telegraph lines, 13 wireless stations and 28 telephone offices, during the last several scores of years since she was first opened to foreign trade. There has been no government navigation enterprise. The total registration of privately owned commercial vessels is approximately only 410,100 tons.

For the development of communications the Government has given little financial aid. Most of the capital required was raised from foreign loans and the enterprises have been, therefore, burdened from the beginning with heavy debts. Yet, prior to the Fifth Year of the Republic (1916), these enterprises were able to maintain themselves and showed steady improvement. Their development contributed also to the progress of agriculture and commerce, which were showing signs of great activity. Military movements at that time were likewise efficiently executed, without confusion and all according to preconceived plans. This was due to the fact that the power and responsibility for the administration of the systems of communications were entirely in the hands of the Central Government, in consequence of which smooth operations were secured in normal times, and orders were effectively carried out in times of emergency.

But since the Sixth Year of the Republic (1917), internal wars have been numerous. High military leaders in the provinces mistake the systems of communications as their own instruments of warfare and place these systems under their own control. They have commandeered railway rolling stock, telegraph lines and vessels. Still worse, they have often operated the official systems of communications for their own profit with great detriment to trade and industry. Even revenues needed by the railways and telegraph offices for their own maintenance have been seized. As a result, wages are not paid, and there is no money to buy the materials urgently required for repairing of equipment. Worst of all, administrative officials and the accountants of the railway and telegraph administrations are appointed directly by the provincial authorities who recklessly exploit the properties and revenues of communications. This state of affairs lends favorably to corruption. The provinces, on the one hand, lack the means of preventing corruption, and the Ministry, on the other, is powerless to check dishonesty. Public funds have been utterly mishandled and Government credit is seriously affected. Because of failure to live up to loan agreements, international control of railways has been proposed and the discontinuation of acceptance of cable messages for dispatch abroad on credit threatened. Our official documents are full of warnings as to what may happen.

It is apparent to all that without rolling stock, telegraph lines and vessels and the proper administrative officials to operate them, no revenues can be produced. With rolling stock, telegraph lines and vessels seized and the appointment of administrative officers interfered with, the railway and telegraph systems will cease to become useful and must collapse as revenue-producing instruments. Indirectly the progress of civilization, or political, economic, financial and industrial development and of military organization and national defence is hindered. To avert the peril, it is imperative that the power of administration of the communication systems shall be centralized.

In the following we beg to submit in great detail the reasons showing the necessity of Unification of Administrative Control and the evils due to the lack of such control during recent years in China.

I. The Power of Appointment

(*a*) Different from the ordinary administrative departments of the Government, the communication systems require, in all ranks, men of technical training and experience. Promotions are made step by step in accordance with merit and seniority. Opportunists are discouraged, and none are dismissed without sufficient reason. With security of position and steady promotion, men are encouraged to do good work and remain in the service. So it is not infrequent to find men who remain loyal and contented in the service of communications for a long period of time. Efficient organization is thus secured. The success of the communications systems in China in former years is a positive proof of the efficacy of this system.

A change has taken place in recent years and the provincial authorities have frequently interfered in the appointment of administrative officers. Men are now being lifted into eminence from relative obscurity, and men of low intelligence are put in positions of responsibility and authority. Even dismissed employees are reengaged, and sometimes placed in high authority. Such unfair treatment naturally reacts on the honest and deserving members of the staff. Furthermore, the newly appointed officials are either incapable of properly performing their duties because of their lack of experience or ability or have shown themselves to be corrupt and in utter disregard of the traditions and official Rules and Regulations. Enormous losses are frequently caused thereby. Those high provincial officials who interfere in the employment of men in the service of communication systems do not realize the serious consequence resulting from their desire to help their friends, and the men they put in frequently flout the orders of the Ministry, since they know that the Ministry is powerless to enforce its orders. It is said in the Classics that the government shall only be as good as the men in it and that experience should be the first consideration in the appointment of men. Where there is no definite system governing appointments and where there is no central authority to enforce rules and regulations, efficiency and proper selection of men are impossible.

(*b*) Men in the service of communications should be selected by examination or promoted by merit and length of service mentioned above. Their duty is to carry out the policy of the government and obey orders of their superiors as required by the Law of

Civil Service. They are merely fulfilling their duty when they do what they are ordered by the proper authorities and it can not be construed that there are political motives behind their acts. In recent years, the spirit of partisanship has been excessive and many dutiful officers in the service of communications have been dismissed, regardless of their ability and experience, just because their faithfulness toward their duties has been mis-interpreted as acts of loyalty toward some particular party or clique. It shows the lack of appreciation on the part of political leaders of the fact that men in the service of communications have been employed on the basis of their technical training and experience. Since these men can make their living best by being in the service of communications, naturally they would not risk their positions on which their livelihood depends by taking sides in political issues. In times of emergency when the systems of communication are commandeered, it is also quite natural that they can not risk disobedience to the authorities imposed on them. In so doing, they should not be considered as taking sides, nor should they be discharged on this score. If this spirit of discipline and the faithfulness toward service is disregarded, discouragement and bitter feeling will be engendered. Measures of retaliation will be adopted when a change of political power takes place. Communications will be drawn into the whirlpool of politics, and disorder and confusion will follow every change in the Government, there being no time for the administrative officials to learn their business. So in every war, we find disasters resulting from accident, collisions, explosion of munitions trains and congestion of track. Telegraph communication is delayed on account of the breaking down of the line or on account of inefficiency. The cause of all this is the failure to separate the service of communications from politics, thus making of them a toy in the political game. But on the other hand, if a settled policy is followed and the power of carrying out this policy is invested in the Central Government, men of experience and of technical training will be kept in their positions in spite of wars and changes.

(c) The first secret in the employment of men is fair treatment in the way of rewards and punishments. This is why in the communications service, where efficiency is of first importance, very strict rules are laid down in regard to the number of men to be employed and the grade of their pay. No departure from the rules should be allowed. Even the raise of a few dollars is fixed by regulations. When necessary, certain employees are required to furnish bonds. But since the breaking down of the central authority, the number of employees as well as their pay exceeds the provisions of the budget. Those who gain their places by unfair means may receive the highest pay right at the start, while others who do their work honestly may not receive their regular promotion. Furthermore, those newly appointed high officials who owe their positions to political influence are most ready to violate the established rules and regulations as well as all laws of ethics, since they know that the Ministry cannot remove them, and the provisional authorities will not know accurately what they are doing. It is usually too late to bring them to task when their corruption comes to light. Efficiency and power to check and punish misdeeds and corruption are lost when appointments are made by the provinces instead of the Central Government.

II. Financial Administration

Of the four branches of communications, railways and the telegraph lines were built largely with foreign capital. The navigation service is mostly in the hands of private concerns. The postal service yields enough revenues to maintain itself. The total amount of foreign loans including interest in this connection has accured to $700,000,000. Not appreciating the heavy burden or indebtedness, the provinces, seeing only the large amount of revenues derived from the communication systems, are accustomed to look upon them as a source of income, appropriating whatever funds they require. From the Kin Han Railway alone $10,000,000 are annually appropriated by the militarists. The amount taken from other railways and the telegraph administration is also enormous. The railways and telegraph administration have even been forced to finance the purchase of warships, aeroplanes and munitions by promissory notes. High military officers sometimes even pledge the incomes of communications to secure loans directly. On the other hand, the railway and the telegraph administrations are frequently without the means to maintain themselves and are forced to borrow money at high rates of interest to pay wages and buy materials for urgent requirements. The total amount of money that has been detained by militarists, up to the end of the 13th Year of the Republic amounts to $180,000,000 or $250,000,000 including interest. It is obvious that the only source of income of communications comes from operation and it is absolutely necessary that the properties pertaining to the different systems shall be properly maintained and the operating funds protected. Moreover, business conditions vary from year to year and from district to district. To have a balanced development, the situation of all branches of communications must be considered as a whole, so that the profit of one may be used to help the development of another, the income of one district may be devoted to the aid of a less fortunate one, and the revenues of good years may be laid aside for the deficit incurred in bad times. By a systematic plan of adjustment and reserve, the enterprises of communication may be promoted and expanded to the advantage of the country as a whole. But if the funds at their disposal are taken away at will and recklessly spent for non-productive projects, leaving the various equipments to deteriorate, the enterprises themselves will suffer and the nation will go down with the decline of communications.

(b) To use the revenues of communications for their own development is the policy common to all foreign countries. China did the same thing in former years, and so the communication enterprises were prosperous with funds to maintain themselves in spite of internal troubles. Revenues were on the increase. Due to the fine equipments available as a result of the prosperous conditions, military movements were greatly facilitated. Such a condition no longer exists at present. Heavy losses are sustained, on the one hand, in consequence of military movements and, on the other, due to the detention of rolling stock by military people who use them to transport commercial goods for their own interest and gain. It is estimated that more than $10,000,000 is lost on this score. This is only the direct loss, the indirect loss in consequence of falling off of trade through lack of rolling stock and dull business is a great deal more. The farmers and merchants too suffer for lack of the means of communications, so much so that business had to be greatly curtailed or totally suspended. Panic and uneasiness prevail; shortage of coal, of grain and of cash follows shortage of cars. Peace and order are threatened. It is hard to estimate the enormous losses caused thereby.

(c) It has been pointed out in the foregoing that the railway and telegraph systems of China were financed by foreign loans. There are yet a great many more railways to be constructed and telegraph lines to be extended, as called for by the program of construction. In view of the poverty of the Government and the country, foreign loans will be needed to carry the program through. When China is unable to pay the interest and capital of her existing loans, who will risk their money and give her further loans? Most of the materials required for construction come from foreign countries. In view of the repeated delay in payment for such materials already bought, it has become even difficult to get supplies to submit tenders. Those who take orders from the railways often demand payment before delivery or very high prices. The communications authorities are forced to agree to their terms in order to obtain urgently required materials for maintenance. The situation has gone from bad to worse. Two great dangers are before the country in consequence of the use of revenues from the communications to pay for military expenses. First, it is a direct cause of disturbance of the peace and order of the country. Secondly, if no remedy is found to meet the obligations, the threat of international control of railways and suspension of cable credit may actually take place to the great detriment of the country.

(d) The most important consideration in every business enterprise is to have proper accounting. On account of the heavy foreign and domestic loans, it is very important that the profit and loss of the Communication enterprises shall be carefully accounted for and made known to the public. This is the only way to establish the credit of the enterprises. Since the Third Year of Hsuan Tung, a system of Independent Accounts has been in existence (the system and the effect thereof are explained in another memorandum). All the accounts are carefully entered and balanced, so that there can be no mistakes or omissions. But since this system was destroyed, the men in charge of funds are free to do what they like with public money and alter the carefully devised system of the Ministry to more simplified forms to suit their own purposes. Dishonesty and corruption are thus made easy. There are even cases of alteration of entries, destruction of books and vouchers and of all documents

which would lead to exposure. At the time, the Ministry is powerless to check corruption and when the deed is done, prosecution is only in name. The destruction of this system benefits no one except the dishonest officials, while the communications enterprises and the country suffer.

All the foregoing statements are the result of personal observations, and incidents of evils are too numerous to be set down one by one in this brief memorandum. The time element has a great deal to do with the income of communications. There are busy seasons and slack seasons. Rolling stocks are needed for commercial transportations, and yet militarists take delight in detaining as many cars and locomotives as they can lay their hands on, irrespective of whether they have any use for them or not. On account of the lack of cars and the inability of the railways to handle the freight offered, or to move the goods promptly, merchants are shipping goods by water wherever possible instead of by rail. With reference to the telegraph, official telegrams are frequently several thousand words in length and sometimes trifling affairs or private persons are sent by first class telegrams, while urgent commercial messages are delayed in spite of the heavy charges paid. Business is lost on this account to foreign cable companies. The communication enterprises have come to the end of their resources. If we do not have any remedy for the situation ourselves, others will offer to remedy it for us. Look at the note of the Diplomatic Corps of February 12, 1925 on railway conditions which says in part.

" They (the Diplomatic Corps) feel, however, greatly concerned to witness the continuance of a state of affairs on the Chinese railways, which, if not promptly checked, may threaten to become permanent and will not only throttle the economic development of the country but inflict lasting injuries on Chinese and foreign trade and interests." and also :

" Foreign interests are closely tied up with the railways themselves. Not only that these railways are indebted to foreign suppliers for equipment supplied and actually in use, to the amount of tens of millions of dollars, but for hundreds of millions of dollars are the foreign bondholders of all nationalities interested in the fate of the Chinese Government railways. Unless the control thereof be taken without delay from the hands of the military commanders, who now exploit them for their own account, and the revenue be allowed again to flow into its proper channels, it is evident that the Chinese Government railways will before long become insolvent."

As regards the similar deplorable condition of the Government telegraph offices, the *North-China Daily News* in a report in its issue of February 10, states :

" The war of words which Chinese militarists indulge in preparatory to the mobilization of their armies is almost as costly as the actual conflict. According to a report recently issued by the Ministry of Communications, no less than $20,000,000 is owed the Telegraph Administration by the various government departments and provincial warlords."

The same writer also refers to the great waste caused by the trivial and unimportant messages sent out by militarists and their staff members in the following words :

" I was told during the war between Chihli and Fengtien last year that Wu Pei-fu's staff had one day despatched over 700 telegrams. When I returned to Tientsin I chanced to receive one of these military telegrams. It read as follows : " My dear Mr..... Why you have not write me since you go away from Chinwangtao. I look forward to one leter from you as soon as you are able to write me. Soon we shall meet again in Peking and then I hope we shall have many meetings and talk about our experiences together Please write me to post office Chinwangtao quickly, yours sincerely." There were a few mis-spellings but if they were included, the message might become almost unintelligible. The writer was a member of Wu's staff, occupying quite an important position. After the receipt of this telegram, I realized why press messages were held up for seven days. I can also appreciate the bill that now fills the debit column of the accounts of the Chinese Telegraph Administration."

When such reports appear in foreign papers, it is most likely that newspapers in foreign countries will quote them to the disgrace of our country. The only solution lies in the centralization of control and we appeal to all the members of the Rehabilitation Conference sitting here to use their best efforts and influence to restore to the Ministry of Communications the control over its different enterprises, the power to administer all affairs and to make appointments without external and illegitimate interferences.

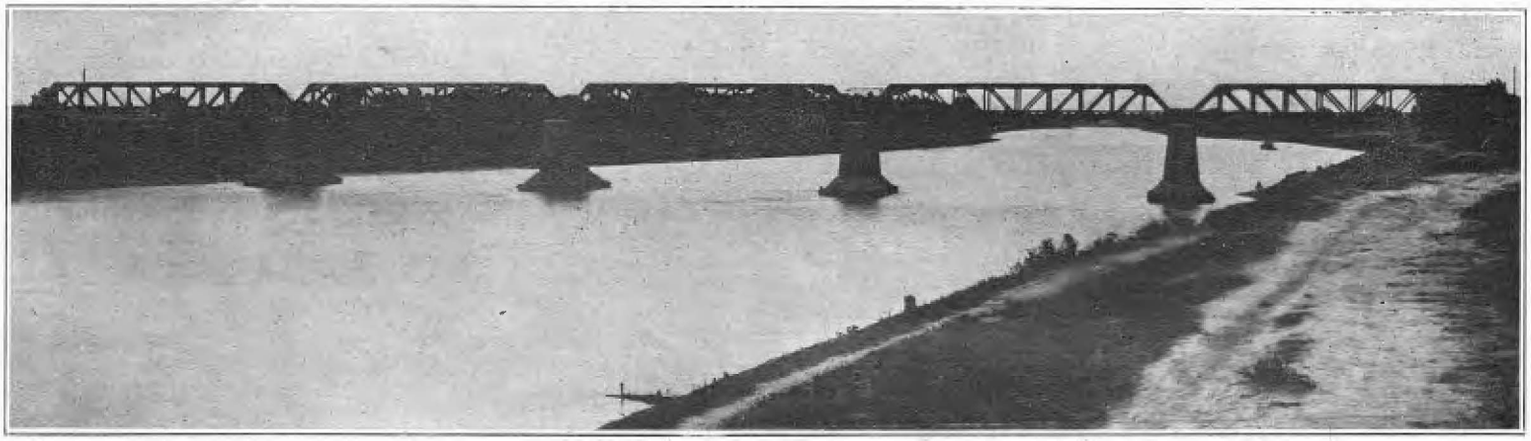
Can Extraterritoriality Be Abolished in China?

MR. Eugene Chen is sometimes vitriolic. His attitude toward foreign nations is often offensive. His antagonism to Japan and Great Britain is incomprehensible in a man of his intellectual calibre. His uncontrolled epigrams, his bitter attacks, his slashing pen bring him a host of personal enemies and there are even some who viewed with a degree of favor his incarceration in a Chinese prison without due process of law. The FAR EASTERN REVIEW cannot join in that point of view. It has to take the attitude that any military interference with the courts of the country, any whimsical arresting of individuals by Chinese militarists is dangerous and can only lead to the perpetuation of extraterritorial jurisdiction in the country.

One often wonders what kinds of brains the Chinese militarists have when they do things of this sort. Just at the time when the attention of the world is being focussed on their country, when foreign commissions of various natures are arriving from abroad, when a commission to study into the possiblities of abolishing extraterritoriality is actually on its way here, a Chinese militarist seizes a journalist in his bed-room, places him under arrest, deprives him of his liberty, transports him to another city, throws him into prison and keeps him there without trial. If Mr. Chen has committed a crime, why was it necessary to take such steps ? Why did not the procurator of the Peking district bring a definite charge against him ? Why was he not tried in the Peking court ? Why was he not given a chance to defend himself ? Why was he not informed of the charges against him ? Why was there no due process of the law ?

Therein lies the crux of the importance of Mr. Chen's arrest. It was without due process of law ; just as everything that is being done in China these days is without due process of law. The FAR EASTERN REVIEW is not anti-Chinese just as it honestly believes that the American, Japanese and British governments would do well by China. The FAR EASTERN REVIEW would give China fair play and would heartily support any steps to return to China her full sovereignty, to bring about a situation of full equality for China among the nations of the earth. But no one can ignore China's present unfortunate predicament, when she has everything to gain and because of internal dissensions, because of lack of government, lack of honestry and honor among her officials, the wealth and strength of the country is being rapidly dissipated. It is that that any other nation wants to take possession of China or believes that such a step would be possible. It is rather that the peace of the world is being seriously endangered by the lawlessness of China. The lack of a strong Government, the failure to maintain the law, the division of the country into fedual satrapies, the constant selfish wastage of funds and the appeals to foreign nations for assistance creates a situation wherein anything is liable to happen. The Bolsheviks are already taking advantage of this chaos to stir up further trouble in Kwangtung and Mongolia. A nation which attempts to exist without law soon becames a prey to every predatory power on the face of the earth. That is China's position to-day.

On the other hand, China and the Powers are actually considering a revision of the treaty relations so that foreigners might at some time in not the too distant future become subject to the laws of China. How can one become subject the laws of a country where there is only lawlessness ? For instance, Mr. Eugene Chen was born a British subject. Adhering to the Chinese race, having a strong sense of racial pride, he denounced his British citizenship and became a Chinese citizen. He sacrificed the rights to which he was entitled under the operations of extraterritoriality and submitted to Chinese law. Then he manages to disagree with a military commander and they throw him into prison. Had he remained a British subject he would have been entitled to the protection of the British crown. As it is, he has no protection for his life or liberty, because the Chinese Government, Chinese law and Chinese constitution are inoperative against even the smallest and least important militarists. Imagine what it is with so great and puffed-up a figure as the Tupan of Chihli. This sort of thing would have been alright in the Middle Ages. It is a very dangerous precedent in modern times when most human beings have opinions and like to express them, irrespective as to whether they please the high and mighty or not.



Bridge over the Grand Canal 5 spans of 100-ft. each

The Lunghai Railway Eastern Extension

By E. R. Hondelink, Engineer-in-Chief, Lunghai Railway, Eastern Division

ON June 11, 1925 the last rail was laid, which completed the track of the railway from Hsuchowfu, the junction on the Tientsin-Pukow railway, to the sea the eastern section of the Lunghai Railway.

The construction of this section was undertaken by the Netherlands Syndicate for China in 1921. Before that year *The Compagnie Générale des Chemins de Fer et des Tramways en Chine*, a Belgian company had constructed since 1912 the sections of the Lunghai Railway, which joined in the east Kaifeng, the existing terminus of the Pienlo Railway with Hsuchowfu, and in the west Loyang, the other terminus of the Pienlo line with the hinterland beyond as far as Kawnyintang.

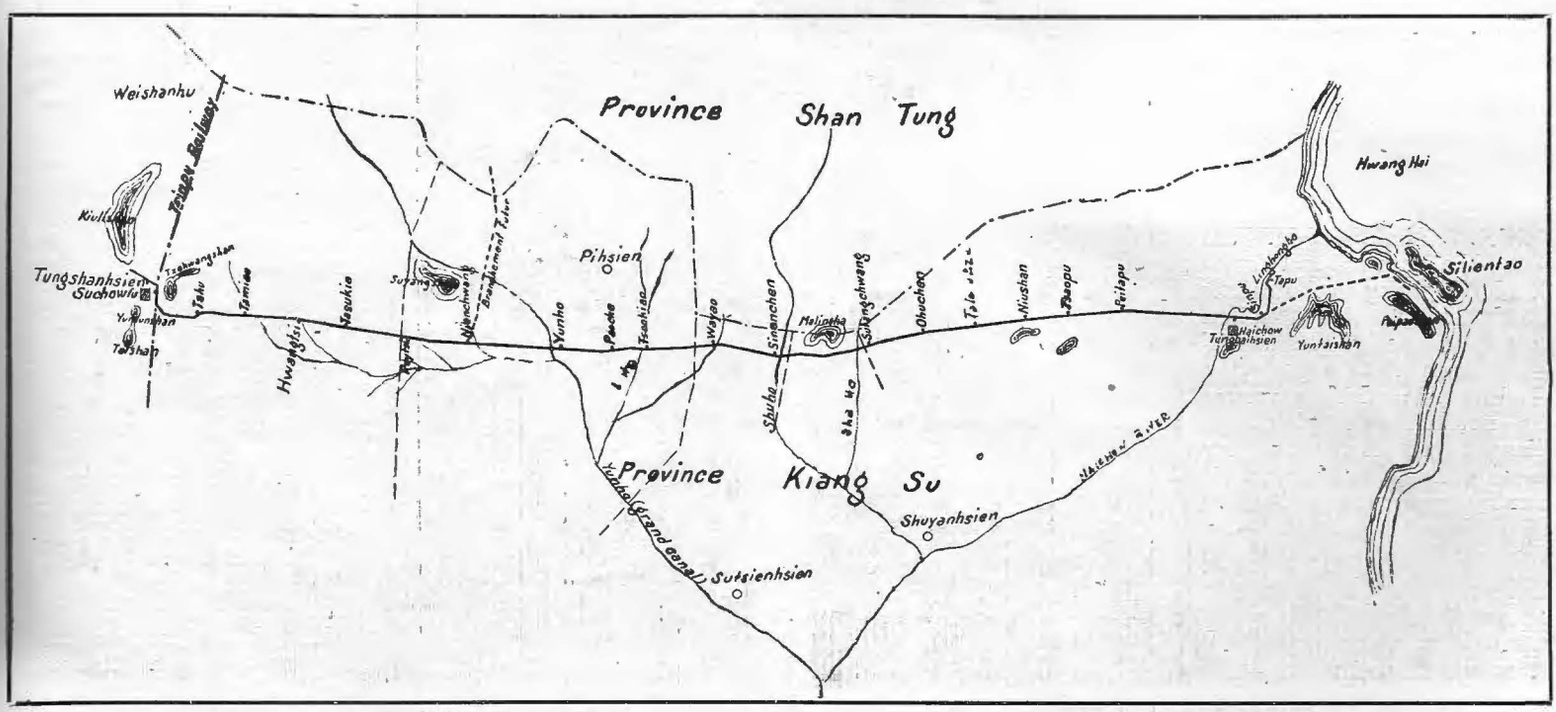
The work on the eastern section was started early in 1921 at the Hsuchowfu end ; in February 1923 the first section, Hsuchowfu—Yunho, 73 Kilometers (45 miles) was opened for traffic.

At Yunho the Grand Canal is joined and a small riverdock has been constructed there for the trans-shipping of goods.

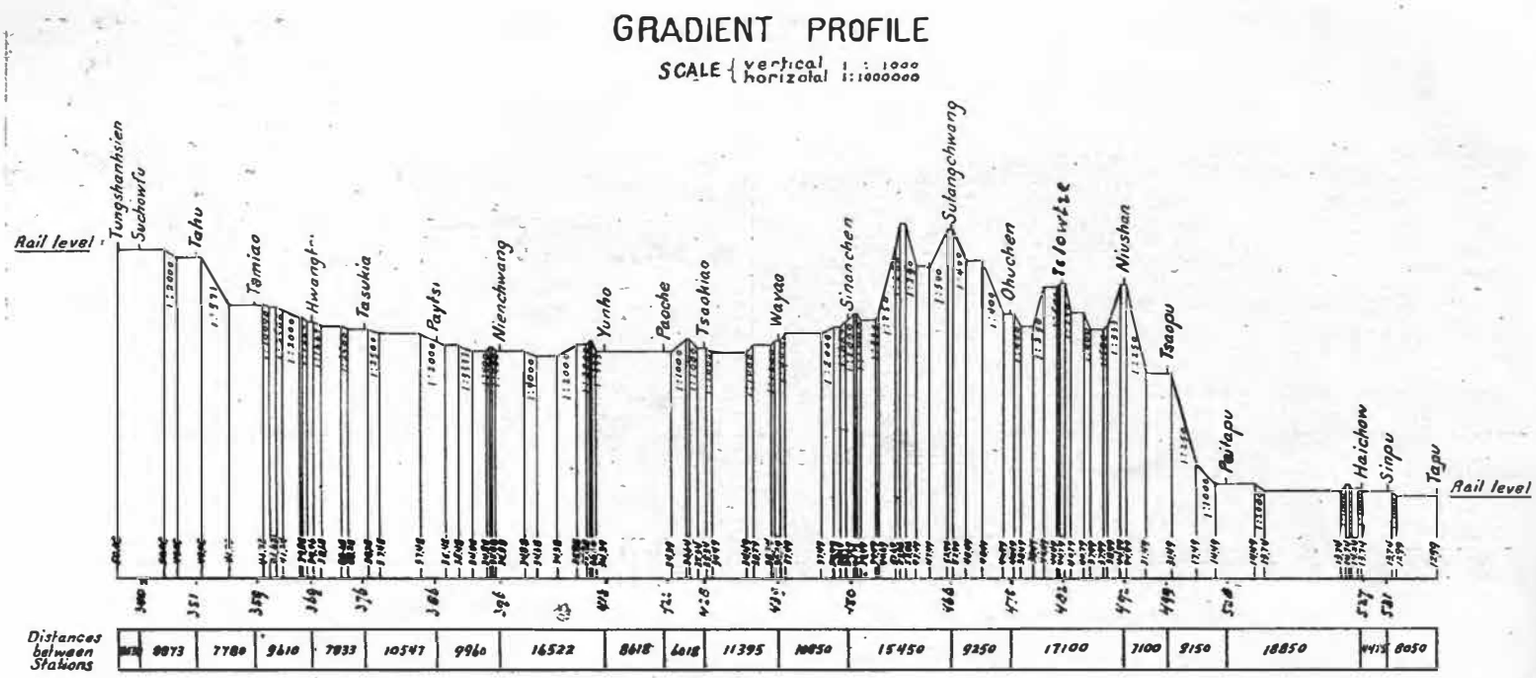
The line from Hsuchowfu is following the northern embankment along the old Yellow River for about 8 miles till where the river turns southeastwards ; from this point on the line is laid practically due-East. The country is flat, yet numerous bridges had to be built to provide enough flood-openings for the water that nearly every summer rain season covers the country. When reaching the Grand Canal the railway is laid on a 10-ft. embankment fortified by stone-defenses. The early construction period was considerably hampered by the exceptionally high floods of the 1921 summer.

In July 1923 the construction of the two remaining sections between Yunho and the sea was started from both ends. The headquarters on the Yunho end were at Yunho, those at the sea end were established at Haichow, a city about 20 miles from the actual seacoast. At this Haichow end the main line terminates at Sinpu station to be continued in the future to an up-to-date seaport, which is to be built east of Sinpu on the coastline. For the present a branch line from Sinpu to Tapu on the Haichow river will provide the communication with the sea traffic. After dredging the Haichow river from Tapu to beyond the bar which is actually blocking the river entrance, Tapu may be reached by sea-going vessels up to a thousand tons or so.

The materials for the construction of the railway from the Haichow end were shipped by small boats from Tsingtao. Among the materials shipped were a small 9-6-0 shunting engine, weighing about 40 tons and three flat 20 tons cars. By means of this construction-train were built some 30 miles of track before the construction from the other end was met on June 11, 1925.



General Plan Hsuchowfu-Sinpu-Tapu Scale 1 : 1,000,000



Gradient Profile

The line from Hsuchowfu to the Tapu terminus is practically level throughout. No gradients steeper than 1 in 250 were necessary, the longest incline only being just under 2 miles. The highest embankment is 13-ft. the deepest cutting 20-ft. A few of the cuttings are in rock and advantage of this situation has been taken for the ballast supply of the line. No curves under 1,000 meters (3,333-ft.), radius are laid down in the main line, no station is situated in an incline nor in a curve.

The track is laid of flat-bottomed rails, Chinese standard, 42 kilograms per meter (appr. 85 lbs. per yd.) 9 and 12 meters (30 and 40-ft.) lengths, each 30-ft. rail on 12, each 40-ft. rail on 17 wooden sleepers, the rails fastened by screws, two on each rail in every sleeper. No chairs are used. The joints are opposite, unlike the practice on adjoining Chinese lines, our opinion being that better running and easier maintenance is assured.

The 30-ft. rails and fastenings, of which 50 miles have been laid are of Chinese manufacture, ordered at the Hanyang works just after the European war, before the work started. All the other track materials have been imported from Holland, Belgium, France and Luxemburg.

Limestone ballast has been used from one quarry near Hsuchowfu and from the cuttings in the 2nd and 3rd district. About 20-in. are allowed between rail-and formation level, giving a solid ballast foundation in these regions on the extremely soft earth-embankments.

The line which traverses the northernmost plains of Kiangsu province, very near to the Shantung border, is running parallel to extensive mountain ranges in Shantung. Numerous small and large streams are spanned, some of them almost dry in winter but filled up to 20-ft. deep at a width of to 600-ft. during the rain season in summer. The most important of these rivers are mentioned here:

E. R. Hondelink, Chief Engineer, Lunghai Railway

The Grand Canal near Yunho station, where 5 spans of 100-ft. each, carry the line over the river. Abutments and piers are of concrete with a stone facing, on a solid concrete foundation.

The I-Ho, about ten miles further east, spanned by 6 spans of 100-ft. each. Piers and abutments are of stone throughout here, on a concrete foundation.

The Shu Ho just east of Sinanchen station, also 6 spans of 100-ft. Here abutments and piers are of concrete throughout. The Shu Ho, some 7 miles further east is a smaller river crossed on 3 spans of 100-ft. each, this bridge is constructed like the Shu Ho bridge.

The last big bridge is the Haichow river bridge just west of Haichow station, a bridge again of 6 spans of 100-ft. similar to the Shu Ho bridge. This bridge was constructed outside the existing river bed, just where it made a double curve. After completion of the bridge a new river bed was cut passing under the bridge; at the same time the old curves were cut off.

Besides these bigger spans, several smaller have been built with one or more spans of 3,5,6,10,15,20 and 30 Meters (10,16,20,33,50,70 and 100-ft.), and combinations of these dimensions such as a span of 100-ft. in the contre and one of 33-ft. on each side. Altogether the bridge openings amount to 2,457 meters (8,000-ft.), being 12 meters per kilometer of line, or 64-ft. per mile.

The steelwork for all these bridges was partly ordered from Holland, and partly taken over from the western section, who had ordered large quantities of bridge steelwork from Belgium and from the Hanyang works in Hankow.

The stations are from 4 to 7 miles apart, as much as possible planned near important towns and villages. The most important stations are; Yunho at the crossing of the Grand Canal, at the same time an

33-ft. Span Bridge with Temporary Track

engine and watering station. Then Sinanchen at the crossing of the Shu Ho, also a watering station. At the east end three stations, Haichow for the town of that name, an important passenger station, Sinpu, 2 miles from Haichow for the commercial town of Sinpu and Tapu the terminus on the Haichow river. Besides Yunho, Sinanchen and Haichow, already named, water plants are built at Tasukia between Hsuchowfu and Yunho and at Talowtze between Sinanchen and Haichow.

All station buildings are erected in semi-Chinese style, hollow brickwalls on a stone foundation and a Chinese roof, the stations near the cuttings through the limestone are built entirely in stone.

Each station has at least one platform of standard width (30-ft.), and length of 500-ft., 30-in. above rail-level. Each station—one small wayside halt in the Hsuchowfu-Yunho section excepted—has at least one crossing loop and most of the stations have one or more goods sidings.

The line will be completed for regular traffic in September next. It will be worked as one line with the existing western section of the Lunghai Railway and the Pienlo Railway, which runs from Shanchow to Hsuchowfu. The traffic expected consists in agricultural products from the west for export, and coal from the Honan and the Shantung mines along the Tientsin-Pukow railway, north of Hsuchowfu. Further, salt from the important salt regions round Haichow in the return direction.

The rolling stock of the existing Lunghai and Pienlo lines will be used, which has been completed by eight 2-8-2 heavy goods locomotives, and 200 open and covered cars, supplied by Dutch firms.

As mentioned already a scheme for a modern seaport is being studied, which ulteriorly must greatly improve the terminus facilities.

The eastern section has been constructed under foreign supervision, with the assistance of Chinese engineers, all works have been let out on contracts to Chinese contractors.

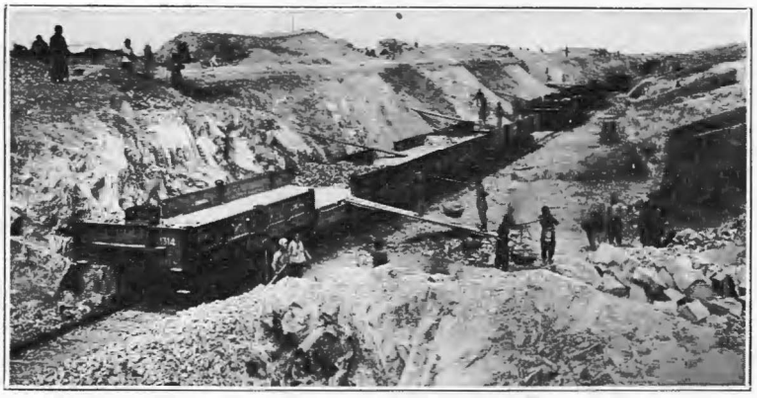
The total cost of the line has been approximately Mex. $8,000,000 which works out at about $40,000 per kilometer or $64,000 per mile.

The work has been hindered by the floods of 1921, 1924 and 1925 as well as by the civil war of 1924-1925, but serious accidents have not been met with.

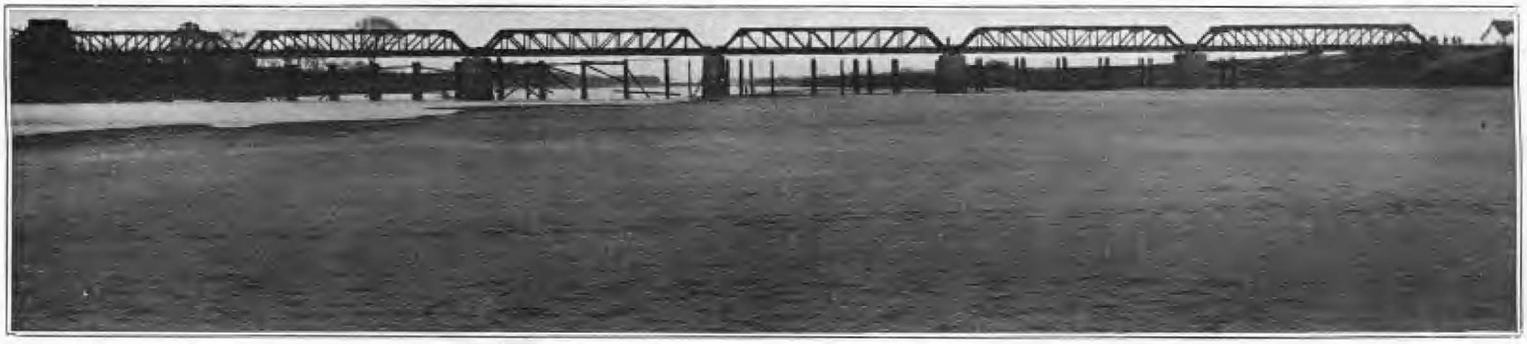
Typical Staff Quarters

I-Ho Bridge, 54 miles from Hsuchowfu 6 spans 100-ft. each. In summer this river has a very strong current

Pay Tsi, an Important Intermediary Station, 30 miles from Hsuchowfu



Loading Ballast in the Second Cutting at Malingshan



Shu Ho Bridge, 6 Spans of 100-ft. 70 miles from Hsuchowfu

Excavation Work on the Grand Canal

100-ft. Span Bridge over a Creek

Shu Ho Bridge

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

THE RED INVASION OF MONGOLIA

AND YET AGAIN, THE AUTUMN MANŒUVRES

JAPAN'S STAND AT THE TARIFF CONFERENCE

THE LAUNCHING OF THE "TAISHAN"

ELECTRIC POWER DEVELOPMENT IN NAGOYA, JAPAN

THE DIESEL ENGINE IN FAR EASTERN VESSELS

ASBESTOS IN THE PHILIPPINES

THE DAIREN BEAN OIL INDUSTRY

Vol. XXI October, 1925 No. 10

SHANGHAI, PEKING, TOKYO AND MANILA

Financial Independence of the Administration of Communications of the Republic of China

By H. E. Yeh Kung-Cho, Minister of Communications

NEARLY half a century has elapsed since China began to possess modern means of communications. A special department of the Government was established 20 years ago to attend to their administration and development. Still only a few people possess a clearly defined idea of the nature and functions of communications as related to society and the government. For a modern society communications are as indispensable as water and air to human life. Without them civilization steps back immediately to the mediaeval ages.

This idea is clearly understood in foreign countries; so they zealously work for the improvement of communications. Progress serves only to stimulate further efforts, and every day brings forth new glories in achievements, either in the way of invention or expansion. China, on the other hand, lags in the march of progress, failing even to maintain what means of communications she has already constructed.

It is a fair question to ask, what is the cause of China's backwardness? An attempt was made indeed to lay the foundation of the systems of communications on a solid basis, when in the third year of Hsuan Tung (1911), a system was adopted providing for the independence of the administration of communications. In this system were incorporated the best points of all countries, after a careful and thorough study of the subject. Financial integrity of the systems of communications is necessary, because as commercial enterprises, they must have their funds at their own disposal and further safeguarded by accurate accounting. Hence the Special System of Accounts.

It is to be observed that financial integrity of the Communication Systems is provided for in the laws of all foreign countries. The best known system is to be found in the new constitution of Germany, Article 92 of which states:

> "The national railroads, irrespective of the incorporation of their budget and accounts in the general budget and accounts of the Commonwealth, shall be administered as an independent economic enterprise, which shall defray its own expense, including interest and the amortization of the railroad debts, and accumulate a railroad reserve fund. The amount of the amortization and of the reserve fund, as well as the purpose to which reserve may be applied, shall be regulated by special law."

Article 30 of the Japanese Accounting Law provides that in case of necessity, when the law is not applicable, a special law of accounts may be established. The first article of the Japanese Railway Accounting Law also expressly states that for the purpose of railway administration and with the object of safeguarding railway funds and regulating the disposal and use of the funds, all the earnings and miscellaneous revenues may be applied to the use of railway enterprises, and an independent system of accounts may be established.

The idea of financial integrity is to give recognition to the fact that the accounts of government-owned enterprises are different from those of ordinary government offices. So a separate system, adequate and suitable for the purpose, must be established. The fundamental principles underlying such a system should, however, be the same as those of the general system of accounts, and the authority for its establishment should be derived from the accounting law of the country. (The existing railway accounting regulations of this Ministry, for instance, are based upon Article 34 of our Accounting Law, which states that in case of necessity when this law is not applicable, a special law of accounts may be established). Such a system is, therefore, a part of the general system of finance of the government and is subject to the supervision of the law of the country.

From the foregoing, it will be seen that legally the system of independent accounts for government-owned enterprises is well established. It remains to be shown in the following that unless such a system is established, no public utility or other enterprises of the government can be prosperous.

To illustrate, the example of commercial concerns may be taken, for in the final analysis the principle determining the success or failure of a government-owned enterprise is the same as that of a commercial concern. The first essential to the success of a commercial concern is to have proper accounting; business accounts must be kept strictly separate from household expenditures, otherwise there will be no way to ascertain whether the business is making money or not. When the business is of the nature of partnership or company, such a separation of accounts is imperative. The same principle governs the operation of government-owned enterprises. In the same way their accounts must be kept strictly apart from those of governmental expenditures. When the enterprise is financed by the joint capital of the people and the government, the necessity for a separation of accounts is obvious.

The fact that government-owned enterprises are run primarily for the benefit of the public and secondarily for profits does not alter the fact that they must be run successfully. No one can bring success to an enterprise when it has no capital to begin operations with or when its funds are being taken away as soon as it makes money. So when the government plans to develop an enterprise, it must appropriate for it a sum of money to be used as capital, and this capital must be applied exclusively to its development. If the enterprise makes money, the funds at its disposal must be used primarily for its development and expansion, and should not be appropriated for other purposes until its needs are taken care of adequately. On the other hand, failure is as certain as that the sun will rise, if the funds of an enterprise are treated in the same way as an ordinary source of government revenue to be appropriated at random. The system of independent accounts has for its purpose the preservation of the funds of government-owned enterprises for their own use first, hence the necessity of its establishment.

Chinese Government-owned enterprises are still in a stage of infancy. Protection is needed to nourish their growth. On account of the poverty of the national treasury, no financial assistance has been given or can be expected from this quarter. They must look to themselves for mutual aid. A judicial adjustment of the funds at their disposal is necessary to render help to those enterprises which are still undeveloped from the profits of the established ones. This will be impossible if the funds are taken away, and the result will be to kill off, or arrest the progress of all the enterprises. For their welfare, protection in the form of an independent system of accounts is absolutely necessary. There is another reason why the funds of Government-owned enterprises must be protected, as it affects not only the enterprises, themselves, but also the credit of China. Most of the Government-owned enterprises were financed originally by foreign loans. Foreigners are interested in their having a sound financial system. So unless their funds are safeguarded from misappropriations, their credit is bound to suffer, which will naturally give rise to complaints and criticisms. The demand for protection of Government-owned enterprises and the credit of China is another reason why an independent system of accounts should be established.

The establishment of an independent system of accounts is dictated, therefore, by reasons of legality and necessity. It must be pointed out as a conclusion drawn from the facts mentioned in the foregoing that independence of accounts should be established not only in the narrow limits of Communications but it should have

a wider scope to apply to all Government-owned enterprises. This seems to be lost sight of in China, and it has been thought that it applies to communications alone, since the latter were the first to adopt the system. Misunderstanding has given rise to criticisms, which are not well-founded, in view of the fact that the system in its methods and operations, is even more elaborate than the ordinary system of accounts, providing a great many more safeguards against corruption and dishonest practices. The usual procedure of examination of the budget and accounts by the authorized Government Bureau of Audit is provided for. Furthermore, the accounts and statistics are published annually and made available both in China and abroad, thus wide publicity is given to them.

China's trouble lies not in the want of a good system but in the fact that the good system is not effectively enforced. During the last 13 years, the so-called financial integrity of the administration of communications exists only in name. It has been trammelled and put under fetters. There is no public opinion to come to its rescue and restore it to its proper function. As a result the revenues from Communications during the last 13 years have been diverted to other purposes, and loans have been contracted ostensibly for the purpose of their development but actually to meet the requirements of governmental and military expenses. In more recent years, the revenues of the railways have become a source of income to militarists, who appropriate them directly. The Kin Han Railway alone supplies more than $10,000,000 annually to military requirements. The funds that have been seized from other railways and telegraph offices are enormous. Not satisfied with merely commandeering the earnings, railways and telegraph offices have been obliged to borrow money at a high rate of interest to meet these military demands. There have even been cases of high military officers borrowing directly from the merchants pledging the revenues of communications as security, and pressure has been brought upon the railways and telegraph offices to pay back the loans accordingly. It is estimated that up to the end of the 13th year of the Republic no less than $180,000,000 have been appropriated, seized and taken away in one way or other by different forces. If interest on this amount is calculated, the total amount comes up to $250,000,000. The funds at the disposal of the means of communications are drained dry and the revenues yet to be earned are mortgaged. The means of communications are left with no funds to carry on their operation. If the independence of accounts had been enforced, such an enormous amount of money could be used, in the first place, for the amortization of debts, which would greatly lessen the burden of indebtedness; and in the second place, it might have been used to start new enterprises. The benefit that would accrue from this would be even greater. But what do we find now? The funds of the railways are exhausted, and debts are piling up. Work on incompleted lines is interrupted, and deterioration overtakes the existing lines, which are gradually becoming useless. There is no money to buy even the material required for daily use, and wages are overdue. Bridges are decaying and falling. Rolling Stocks are broken down and sadly in need of repairs. Traffic is in daily danger of interruption, in consequence of deterioration and lack of repair. The telegraph service has the same sad story to tell. Loans contracted for its improvement and expansion have been appropriated by the Government for other purposes, and its revenues have been seized by the provinces. Payment of interest on loans has been long delayed, and telegraphic lines have been allowed to deteriorate without the means for repairs or extension.

The railways and telegraph, for which the energy and labor of several tens of years have been spent, are now on the brink of bankruptcy. Navigation and the post fare better, but this is because navigation is still in the stage of infancy. The post is only able to maintain itself. If no radical departure is made from the present way of doing things, it is reasonable to expect that the railways, and telegraphs will become so deteriorated in a few years as to become useless. In that event, the difficulties and sufferings that will overtake the nation and the people will be impossible to describe.

Recent events may serve as a warning of what the future has in store. During the last few months traffic was interrupted on account of war. A loud cry of suffering rose from the people. But this was only a temporary state of affairs. Compared with this how much greater would be the suffering should all the railways and telegraphic lines be broken down at the same time on account of deterioration. Repairs can not be completed in a day, and it is questionable whether the Government, poor as it is now, is financially able to undertake repairs on a large scale.

Facing the possibility of total destruction in the not distant future, the immediate problem confronting the country is to maintain the *status quo* of the means of communications, that is to prevent them from becoming worse. Other problems of improvements and expansion are of secondary importance. To merely maintain the *status quo* the first question to which we must direct our attention is how to enforce the financial independence of the administration of communications, which will preserve their revenues for their own maintenance and improvement and for the completion of unfinished lines.

The importance of financial independence of the administration of communications must be clearly understood by the people and popular support must be given to it. If this is obtained, it may then be said that the true foundation of communications is laid. Gradual and steady improvements may then be planned. As the means of communications improve, all other business will progress in their train. In the future when the income from communications is increased, any surplus after deducting what is needed for the amortization of debts, expansion and improvement and for the reserve fund, will naturally be handed over to the Government to supplement its treasury. But if the foolish policy of killing the goose to get the golden eggs be continued, it will be not only the communications business that will suffer but all other new projects also. We tremble when this point is considered. Moreover, we are reminded all the time of the heavy foreign investments in our means of communications by the presistent cry for international control of our railways. If we do not ourselves plan a remedy now, others will presently plan one for us. We can not forbear to mention the direful consequences this will bring to China.

This Ministry being entrusted with the administration of communications, we are more thoroughly acquainted with the real state of affairs. We are in duty bound to lay before the Conference what we consider as the real danger that is threatening the existence of the means of communications and beg to submit herewith our proposal of remedy, which is summed up in the recommendation to preserve and enforce the financial independence of the administration of communications.

Letter to the Ministry of Finance from the Ministry of Communications

With the opening of the Rehabilitation Conference* it is necessary that the respective departments of the Government each submit its plans of reorganization and reconstruction so that they can be carried out with the approval of the Conference.

Aside from the administrative problems which concern this Ministry alone and which the Ministry of Communications has already submitted to the Rehabilitation Conference for consideration, the problem of finance in its bearing upon the systems of communications must be given due attention. As the Ministry of Finance is in charge of all government financial matters of the country, it is deemed proper that the problem of making good the financial losses in the recent years and of devising ways of adjustment must be submitted to the Rehabilitation Conference for its consideration through the Ministry of Finance. If the Ministry of Finance has already submitted its own plans, it is hoped that it will send in the enclosed memorandum with annexes as a supplementary document.

Memorandum of Financial Readjustment

The fact is well admitted by those who have made a study of the policies of communication and transportation in any country that these enterprises are highly necessary to the development of its civilization and industry and to its military affairs and national defence. China cannot at present boast of an adequate system of communication and transportation. In the case of navigation, she has not a single government enterprise to speak of, and those started by the merchants have seldom been encouraged or assisted by the Government. In the case of post and telegraph, there is still ample room for improvement and extension, although the important cities and towns throughout the country can all be reached now either by mail or by telegraph. As to railways, it must be admitted that, except in a very few cases in which China had made plans of her own to attain the above mentioned objects, most of the railways

*A Conference called during 1925 to reconstruct the Government of China. It failed to accomplish anything.

were built with foreign loans, with plans all initiated and laid down by the creditors.

Since the very beginning, China has succeeded in constructing only a few of the trunk railways of the country, with little or nothing else to boast of. While the lack of funds at the outset has been largely responsible for this inactivity, the fact that the incomes of the railways have frequently been diverted has made extension impossible and brought about the present condition. In the recent years, instead of making an effort to maintain these means of communications and transportation in their infancy, there has been repeated encroachment upon them. The retention of the telegraph and railway revenues to meet military and administrative expenses, the mortgage of railway and telegraph property for loans, and the non-payment of transportation and telegraphic charges are direct encroachments which are frequent and which affect very seriously the financial conditions of the railway and telegraph administrations. The indirect encroachments are more frequent and numerous, which consist in the detention of cars and locomotives, interference with the appointments of officials and the carrying on of ordinary business, forcible seizure of telegraph and telephone wires, issuance of unlimited number of free passes, despatch of official telegrams without paying for them, appropriation of railway and telephone and telegraph materials, and finally, destruction of the different kinds of expensive engineering work. The result is that, according to an estimate made at the end of September of the 12th Year of the Chinese Republic (1923), the total indebtedness of the Ministry of Communications runs over $707,300,000. This figure has not changed much during the last two years.

It is indeed sad to say that the present enterprises of communications are in a very bad state. The fact that all engineering structures are breaking down and equipments deteriorating presents a serious danger to the continuance of the enterprises. That the incomes can not meet the expenses and that the debts are piling up is the financial phase of the peril. What is still worse is a steady undermining of the economic foundation, which is necessary to the maintenance of a sound financial policy. In the past, the Ministry of Communications had always been able to meet its obligations at home or abroad. Although there had been delays sometimes in meeting the internal obligations, for which satisfactory arrangements were always possible, the Ministry had never failed, in spite of all financial difficulties, to maintain its credit abroad. It was for this reason that the Ministry had then still a sound financial policy. But the case is quite different in recent years. The Ministry has not only failed to make good its internal loans, but also failed to meet its obligations abroad. It was only with great difficulty that the Ministry managed at the end of last year to make good its Hukuang loans. The Japanese Legation has repeatedly pressed for repayment of principal and interest on the Yokohama Specie Bank Loan. The Great Eastern and the Great Northern Cable companies are about to discontinue the practice of sending cables on credit, for the Chinese Government has failed to pay either the interest or the principal of their loans. The next payment for the coupons of the German portion of the Hukuang Bonds—having been postponed last year pending a diplomatic settlement—will require a sum of no less than $3,000,000, and there is no definite plan yet to meet this obligation although it may soon fall due. There are many other minor loans for purchase of materials from abroad, which have not yet been made good. The internal indebtedness includes many short-term loans from the Chinese banks, bonds and promissory notes issued by the different railways (not counting the funds which should be reserved for redemption of railways but which have not been paid over). All these short-term loans have been extended again and again, and the different kinds of bonds and notes which are held by the Chinese and foreigners alike have not yet been redeemed. Failure on the part of the railways to make good these bonds sacrifices the confidence of the people, the absence of which would leave no room for financial activity in the future. This deplorable condition, coupled with a total obligation of $707,300,000 with a heavy yearly burden of interest and principal, would make it immensely difficult to maintain the present enterprises of communications as they are. It would be next to impossible to extend or to improve them so as to be helpful in the spread of culture, development of industry, and promotion of military affairs and national defense.

There is, however, a ray of hope, for there is a way to work out a plan of financial re-organization for the Ministry of Communications. The plan is twofold: that which is internal, concerning the Ministry itself, and that which is external, lying beyond the control of the Ministry. The internal part consists in a revision of the transportation tariff, postal, telegraph and telephone rates, reduction of the members of the staff, and economy of materials, so that the income can at least meet the expenditure. In case of any surplus, it can be spent on improvement and extension of these enterprises. All these matters, including considerations for the care of property and maintenance of credit and confidence, are within the proper purview of the Ministry, which has already instructed the different offices to carry them out in the most careful way possible. The external part of the plan depends first upon the removal of all the unnecessary obstacles which have obstructed the administrative unity of the Ministry, and secondly, upon the maintenance of an independent system of accounts, which does not permit any borrowing or appropriation of the revenues by any other party. In other words, the independent financial policy of the Ministry of Communications must not be dynamic, but static, and must not be subjected to the handling by any other department. We need not here go into the reasons for this static policy, which are given in a separate memorandum.

For a sound financial re-organization of the Ministry, a general re-adjustment of its internal and foreign loans is most important. The Ministry of Communications has, as stated, a total indebtedness of over $707,300,000. Of this amount, about $87,200,000 (representing loans on Kao-Hsu, Chen-Tsi, Mongolian, Ki-Hui, Cheng-yu, Tung-Chen, Shanghai-Hangchow Railways, and Telegraph loans) were originally used by the Ministry of Finance, which should, therefore, be responsible for their repayment. The remainder should be met according to the following ways:

A. Those which can be dully paid with available resources, such as the Peking-Mukden Railway Loan, the Tientsin-Pukow Railway Loan, and the Shanghai-Nanking Railway Laon, amount to a total of about $319,200,000. They can be, as they have been, regularly paid out of the revenues of these railways (See Table A for details).

B. Those short term loans amounting to a little over $80,900,000, can be repaid from the surplus of railway and telegraph revenues. (See Table B.)

C. A total of over $219,900,000 should be turned over to the Commission on Financial Readjustment. A portion of this total relating to loans for railways and telegraph construction the Ministry of Communications will endeavour to meet, while the remainder is entirely beyond its resources (See Table C.)

The Ministry of Communications will undertake to repay the loans of the classes A and B, as it has done in the past, either out of the revenues from the post, telegraph, and railways, or from the surplus after a revision of the rates. It is beyond the resources of the Ministry to do anything for the loans of class C. For the last few years, the advances made to the Ministry of Finanace amount to no less than $180,000,000 in principal alone, without counting interest. It is perhaps unnecessary for this Ministry to recover these advances from the Ministry of Finance directly, but at the same time, it is planned that the loans of class C should be included among those for general readjustment. The Ministry of Finance must have plans of its own to adjust all the unsecured obligations either with the 2½ per cent. tariff increase or any other financial resource as security. How the small loans are to be consolidated and how the short term loans are to be converted into long terms are questions for the Ministry of Finance to decide. As far as the Ministry of Communications is concerned, it craves the sympathy and understanding of the whole country, for much that is to be re-adjusted lies beyond its own power. As a sound financial policy for the Ministry of Communications is a vital problem to China, we hope that the day will soon arrive when an independent system of accounts that the day will soon arrive when an independent system of accounts will become a fact, when responsibilities for the loans are all divided, and when administrative authority will be centralized. When that day comes, there can be a financial re-organization of the Ministry, which will in the end mean a great boon to the future of the enterprises of communication and transportation in China.

We take the pleasure of submitting herewith the reasons and ways for a financial re-organization, which should, with your concurrence, be brought before the Re-organization Conference for consideration and approval.

With enclosures.

(A) Schedule of Obligations with Proper Financial Resources to Redeem the Principal and Interest.

Name of Loan	Amount of Principal Outstanding at September 30, 1923	Amount of Interest Unpaid of Matured Liability at September 30, 1923	Various Currencies converted into Dollars
Peking Mukden Railway Double Track Loan	£ 440,000.00	£ 14,000.00	$ 6,240,000.00
	$ 1,700,060.00		
Japanese Loan for Hsinmintun Mukden Railway	Y. 71,111.12		$ 71,111.12
North China Railway Loan	£ 1,221,875.00		$ 12,218,750.00
Cost of 400 Wagons and Interest up to 31/12/22	£ 509,237.10	£ 36,659.13	$ 5,058,971.50
Peking Hankow Railway Short Term Loan	$ 387,850.00		$ 387,850.00
Tientsin Pukow Railway Original Loan	£ 1,831,200.00		$ 18,412,500.00
Tientsin Pukow Supplementary Loan	£ 1,299,050.00		$ 12,990,000.00
Shanghai Nanking Railway 5 per cent. Gold Loan	£ 2,900,000.00		$ 29,000,000.00
Shanghai Hangchow Ningpo 5 per cent. Gold Loan	£ 1,125,000.00		$ 11,250,000.00
Cheng Tai Railway 5 per cent. Gold Loan	Fr. 22,815,000.00		$ 3,250,285.71
The Purchase of Rolling Stocks Honan Railway	£ 88,787.52		$ 887,872.54
Honan Railway 5 per cent. Loan	£ 569,100.00		$ 5,691,000.00
Kirin Changchun Railway Loan	Y. 6,500,000.00		$ 6,500,000.00
Advance from South Manchurian Railway Co.	Y. 500,000.00	Y. 47,500.00	$ 547,500.00
Lung Hai Railway Belgian Dutch Loan	Flor. 8,807,000.00		$ 4,403,500.00
Lung Hai Railway Loan	Flor. 16,667,000.00		$ 8,333,500.00
" " " "	B.Fr. 37,743,000.00		$ 5,301,857.15
" " " "	B.Fr. 50,000,000.00		$ 7,142,857.15
The Hongkong & Shanghai Banking Corp. and Banque de l'Indo-Chine	£ 3,750,000.00		$ 37,500,000.00
Lung Hai Railway Loan	£ 4,000,000.00		$ 40,000,000.00
" " " "	B.Fr. 50,000,000.00		$ 7,142,857.15
Lung Hai Railway 7 per cent. Treasury Bonds	B.Fr. 20,000,000.00		$ 2857,142.86
Pien Lo Railway Loan	Fr. 31,000,000.00		$ 4,428,571.43
Ssu Cheng Railway Debentures	Y. 5,000,000.00		$ 5,000,000.00
Advance for Cheng Tao Section	Y. 57,200.00		$ 57,200.00
Temporary Advance for Cheng Tao Section	Y. 8,100,000.00		$ 8,100,000.00
San Tao Short Term Loan	Y. 18,200,000.00		$ 18,200,000.00
Canton Kowloon Railway Loan	£ 1,282,500.00		$ 12,826,000.00
Kiao Tsi Railway Treasury Bonds	Y. 40,000,000.00		$ 40,000,000.00
Hupeh Hunan Section, Commission of the British Chinese China Japan Industrial Development Company	£ 5,702.20		$ 57,021.00
Total amount of Railway Obligations	£ 19,032,451.171	£ 70,659,130	
	$ 2,087,850.00		
	Y. 78,128,311.12	Y. 47,500.000	$ 314,554,347.61
	Flor. 25,474,000.00		
	Fr. 211,558,000.00		
Shanghai Taku New Cable Loan	£ 93,164.00	£ 6,649.00	$ 998,130.00
East Extension Telegraph Co. and Great Northern Telegraph Co. Loan	£ 314,843.10	£ 29,474.2.0	$ 3,443,196.00
Duplicate Taku Chefoo Cable Loan	£ 21,616.00	£ 1,542.00	$ 231,580.00
Total amount of Telegraph Obligations	£ 429,625.10	£ 37,665.2.0	$ 4,672,906.00
Grand Total			$ 319,227,253.61

(B) Schedule of Obligations to be Liquidated by Railways and Telegraphs.

Items	Total	Items	Total	Grand Total
Railway Obligations on Foreign Loans	$12,290,706.46	Railway Obligations on Materials	$34,116,451.10	
Railway Obligations on Domestic Loans	$7,318,388.81	Telegraph Obligations on Materials	$ 5,965,817.85	
Railway Obligations on Bonds	$21,252,843.59			$80,944,267.84

(C) Schedule of Obligations to be Liquidated by Financial Readjustment Program.

Name of Loan	Amount of Principal Outstanding at September 30, 1923	Amount of Interest Unpaid of Matured Liability September 30, 1923	Various Currencies converted into Dollars
Advance for Chu-Ching Railway (American International Corporation)	C.$ 250,000.00	$ 309,673.33	$ 2,919,346.66
Advance for Ching-Men Branch Line	£ 52,972.11.3		$ 529,723.63
Advance for Harbin-Heihmgchiang Railway	Q. Nin 500,000.00	Tls. 127,500.00	$ 896,428.57
Tientsin-Pukow Railway Original Loan Part of Deutsche Asiatische Bank	£ 2,650,000.00	£ 795,000.00	$ 34,450,000.00
Tientsin Pukow Railway Supplementary Loan, Part of Deutsche-Asiatische Bank	£ 1,590,000.00	£ 508,800.00	$ 20,988,000.00
Hukuang Railway Loan, Part of Deutsche-Asiatische Bank	£ 1,070,000.00	£ 346,986.00	$ 14,169,890.00
Tientsin Pukow Railway Loan, Advance from Deutsche-Asiatische Bank	£ 980,424.6.4	£ 409,593.2.1	$ 13,100,174.33
Obligations on Materials of Peking Sulyuan Railway, Han-yeh Ping Iron & Steel Works	Silver 676,985.65		$ 967,122.36
Canton Hankow Szechuan Railway Loan	£ 4,750,000.00		$ 47,500,000.00
The Yokohama Specie Bank Loan	Y. 9,670,000.00	Y. 367,250.00	$ 10,217,250.00
Advance for Improving and Developing Telegraph Corporation Ltd. Lines from East-Asia Industrial Co.	Y. 15,000,000.00	Y. 364,000.00	$ 15,364,000.00
Telephone Loan	Y. 10,000,000.00	Y. 1,930,000.00	$ 11,930,000.00
Marconi Wireless Telegraph Advance	£ 200,000.00	£ 26,235.14.6	$ 2,262,357.00
Domestic Short Term Loan	$ 9,055,149.32	$ 1,083,013.67	$ 10,138,162.99
Direct Expenditure of Szechuan Railway	$ 8,007,560.57	$ 3,161,025.09	$ 11,168,585.66
Indirect Expenditure of Szechuan Railway	$ 9,145,669.23	$ 4,938,661.38	$ 14,084,330.61
Hunan Railway Share (Class A) Fixed Bonds	$ 27,815.00	$ 6,303.40	$ 34,118.40
Hunan Railway Share (Class B) Fixed Bonds	$ 4,194,550.00	$ 534,959.35	$ 4,729,509.35
Hunan Railway Loan to Hunan Bank	Hunan Tls. 672,400.80		$ 517,231.36
Kiangsu Railway Share Fixed Bonds	$ 312,250.72	$ 102,001.90	$ 414,252.62
Chekiang Railway Share Fixed Bonds	$ 880,542.38	$ 61,637.93	$ 942,180.31
Chekiang Railway Bonds	$ 206,600.00	$ 23,243.20	$ 229,843.20
Hupeh Railway Share (Issued by Hupeh Provincial Authorities) Fixed Bonds	$ 161,770.71	$ 36,400.44	$ 198,180.15
Hupeh Ry. Share Subscribed by the Hupeh Authorities out of the Revenue of Rice Tax	$ 589,021.40	$ 26,505.96	$ 615,527.36
Lo-Tung Railway Share	P. Tls. 230,000.00		$ 328,571.43
Tung-Pu Railway Loan (From Different shops)	Tls. 540,050.53		$ 771,500.75
Tung-Pu Railway Due to Shanghai Executive Office	Tls. 97,667.55		$ 139,525.07
Guarantee Interest of Tung-Pu Railway due to Shanghai Provincial Office	Tls. 58,224.45		$ 83,177.79
Advance for Anhuei Railway from Provincial Executive Office	Qua Nin 107,390.45		$ 153,414.02
Advance for Anhuei Railway from Provincial Executive Office	$ 45,219.01		$ 45,219.01
Amount of Anhuei Railway Due to Contractor Yao Sin-Chi	Qua Nin 20,000.00		$ 28,571.43
	G. $ 1,150,000.00	G. $ 300,673.33	
	£ 11,213,396.17.7	£ 2,116,614.16.1	
	Y. 34,670,000.00	Y. 2,861,250.00	
	Qua Nin 627,390.45	Qua Nin 127,500.00	
	Silver 676,985.65		$ 219,936,166.08
	Hu. Tls. 672,400.80		
	P. Tls. 230,000.00		
	Tls. 695,942.53		
	$ 32,626,157.34		

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

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SHALL JAPAN LEAD?

WHEN IS CO-OPERATION NOT CO-OPERATION

DO THE CHINESE HATE THE JAPANESE?

THE NEW ASIA

FIRE FIGHTING MACHINES IN CHINA

THE NEED FOR TESTING MATERIALS OF CONSTRUCTION

GOLD MINING IN THE PHILIPPINES

CONSTRUCTION WORK ON THE F.M.S. RAILWAYS

PROPOSED TRAIN FERRY SCHEMES

THE UJIKAWA ELECTRIC COMPANY

Vol. XXI | November, 1925 | No. 11

Proposed Train-Ferry Schemes for Nanking-Pukow and Wuchang-Hankow

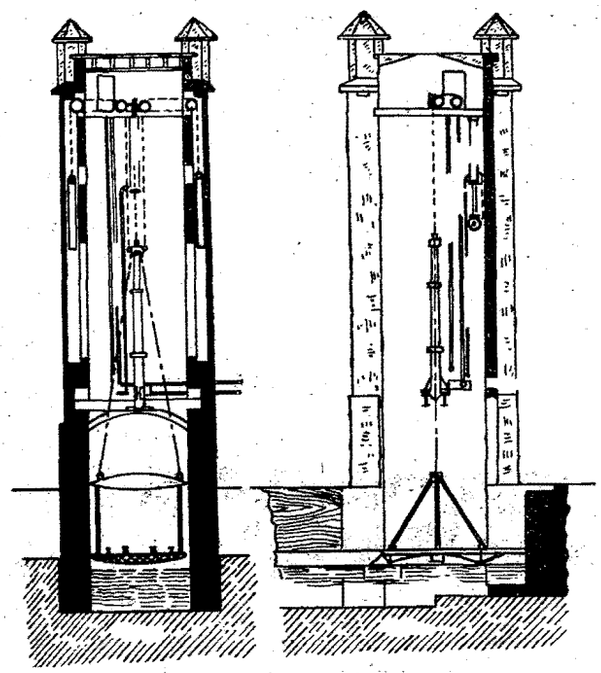
By P. H. Chen.

IT is well known to the traveling public that the most inconvenient part of the journey between Shanghai and Peking is to take the ferry boat between Nanking and Pukow. All the passengers have to get off at Nanking, look after their baggage, and wait for the ferry. On fine days, such accommodation is already unpleasant enough, but on inclement days, which are not uncommon in that section of the country, the conditions are indeed intolerable. Moreover, in order to arrange the train schedule for crossing the Yangtze River in daylight, trains must pass the bandit-infested districts in Shantung at midnight, and this, to a certain extent, was also responsible for the unfortunate Lincheng incident.

Not only passengers have experienced inconveniences and hardships, but the goods traffic has also suffered from poor economy and poor efficiency. At one end of the ferry, all the goods must be unloaded from the trains, loaded on the small boats, unloaded again from the boats and reloaded on the trains at the other end. The handling charges for a 40-ton carload across the Yangtze River have been as high as thirty dollars. Again, in rough weather, small boats have to stop operation, and consequently many cars which otherwise could be used to good advantage have to lie idle. And furthermore, on account of the lack of adequate accommodation, south bound trains from Lunghai Railway are restricted to only one train a day.

That there is a need for improvement of the trans-river service between Nanking and Pukow has been a long past conclusion. One reason why the attention has been neglected is that there have been some people who strongly oppose having the service improved, simply because they have a pet wish to see Pukow developed into a great center of commerce, one to take the place of Shanghai, or one at least equal to Shanghai. It is a matter of fact that, when compared with Shanghai, Pukow would be a better port, as it is very much farther inland while at the same time it has an adequate depth of water to accommodate the biggest ocean liner. Now these people maintain that the improvement of the transportation service between Nanking and Pukow would hinder such a development as desired. But they seem to ignore the fact that the possibility they see is still something in the future while the inconveniences and hardships are actual daily occurences. Fortunately there is a growing number of other people, who while not unaware of the possibility of Pukow as a commercial center, still see the urgency of the need of improving the service.

During the past years, many schemes for solving the problem were proposed by different engineers. Some advocated that a bridge should be built while others offered plans for a tunnel. But such proposals did not seem to have come from those who had actually investigated the site in detail. The present channel is 3,800 feet wide and 154 feet deep at low water. And further, it is by no means a fixed channel; it may possibly be shifted to Pucheng in the future. With unusual depth of water, swift current, and wide, shifting channel, it is beyond one's comprehension to have a bridge built at this site at moderate cost, and for the same reason it is also out of the question to build a tunnel with long approaches.



TRAIN-FERRY WITH A VERTICAL DEVICE ON SHORE.

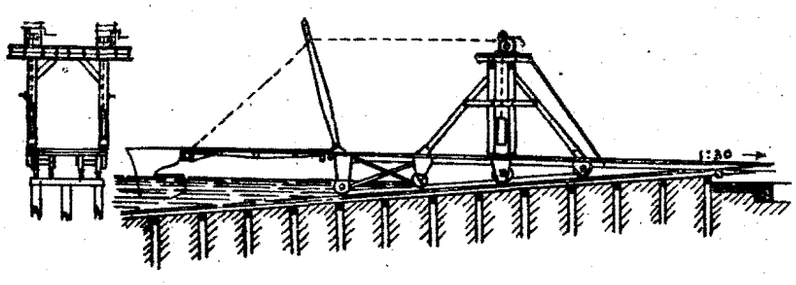
More recently other engineers have proposed the use of train-ferries, of which three different designs have been brought to notice, They are: 1. Train-ferry with a lifting deck; 2. Train-ferry with a vertical lifting device on shore; and 3. Train-ferry with a fixed incline on shore and a triangular movable gangway.

1. The train-ferry with a lifting deck is used in Europe and America only at places where the differences of water levels are small. The deck can be raised or lowered to suit the different levels and usually wire ropes are used for loading and unloading. This type of train-ferry has been very strongly recommended for Nanking and Pukow and details have already been worked out by some British firms, with an estimate of costs as follows:

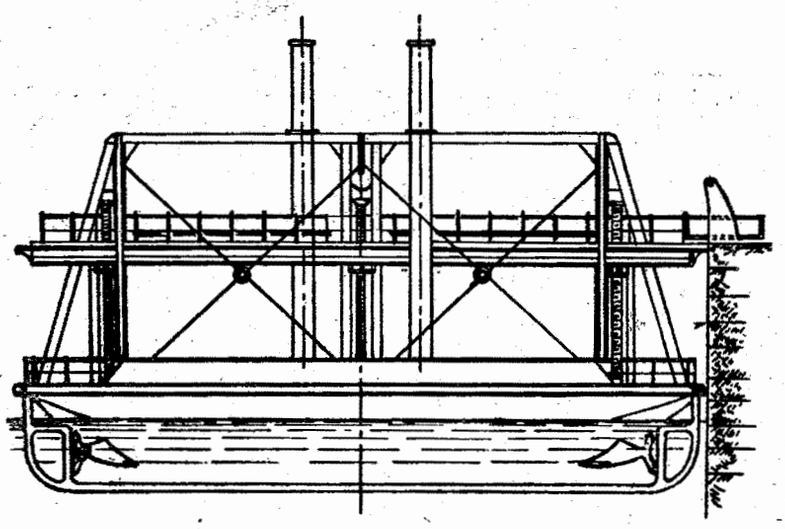
Piling and decking for wharves and jetties, approaches, moorings, earth work, etc.	$1,500,000
Train-ferries	4,100,000
Total	$5,600,000
Land to be acquired ..	1,250,000
Grand total	$6,850,000

In the first place this design is too costly and in the second place it is not practicable. In case of a heavy storm, it is exceedingly dangerous to have trains crossing the river some forty feet above the water level. Even in fine weather, it would have a great deal of psychological effect, on passengers riding at a dizzy height. If the deck is to be lowered and raised each time it is used, it will require too much time and expense. Moreover, such a ferry gets out of order easily and therefore needs too much care.

2. The train-ferry with the vertical lift on shore is common in Europe. The train has to be lowered every time to the level of the ferry and raised up again after crossing the river. Such a scheme requires too much mechanical operation. Nor does it seem economical to install powerful machines with a power house which is used only a few hours a day. Besides, they are easily out of order and the maintenance expense will be consequently very high.



A TRIANGULAR MOVABLE GANGWAY



TRAIN-FERRY WITH A LIFTING DECK.

3. The train-ferry with a fixed incline and a triangular gangway is also being used in Europe and America. The gangway moves along the incline to suit the ferry. But one trouble with this scheme is that a part of the incline is under water all the time, so that in case there is something the matter with the structure, it is very difficult to repair. And further, the mooring place changes with the water level, and it is rather expensive to build a wharf of the right kind.

The schemes and designs mentioned above have been carefully studied and all have been found wanting so far as it concerns their being applicable to the crossing of the Yangtze River between Nanking and Pukow, and therefore in their place the writer wishes to propose in the following paragraphs a new train-ferry scheme, which is at once simple in construction, easy to operate, and cheap to build and maintain.

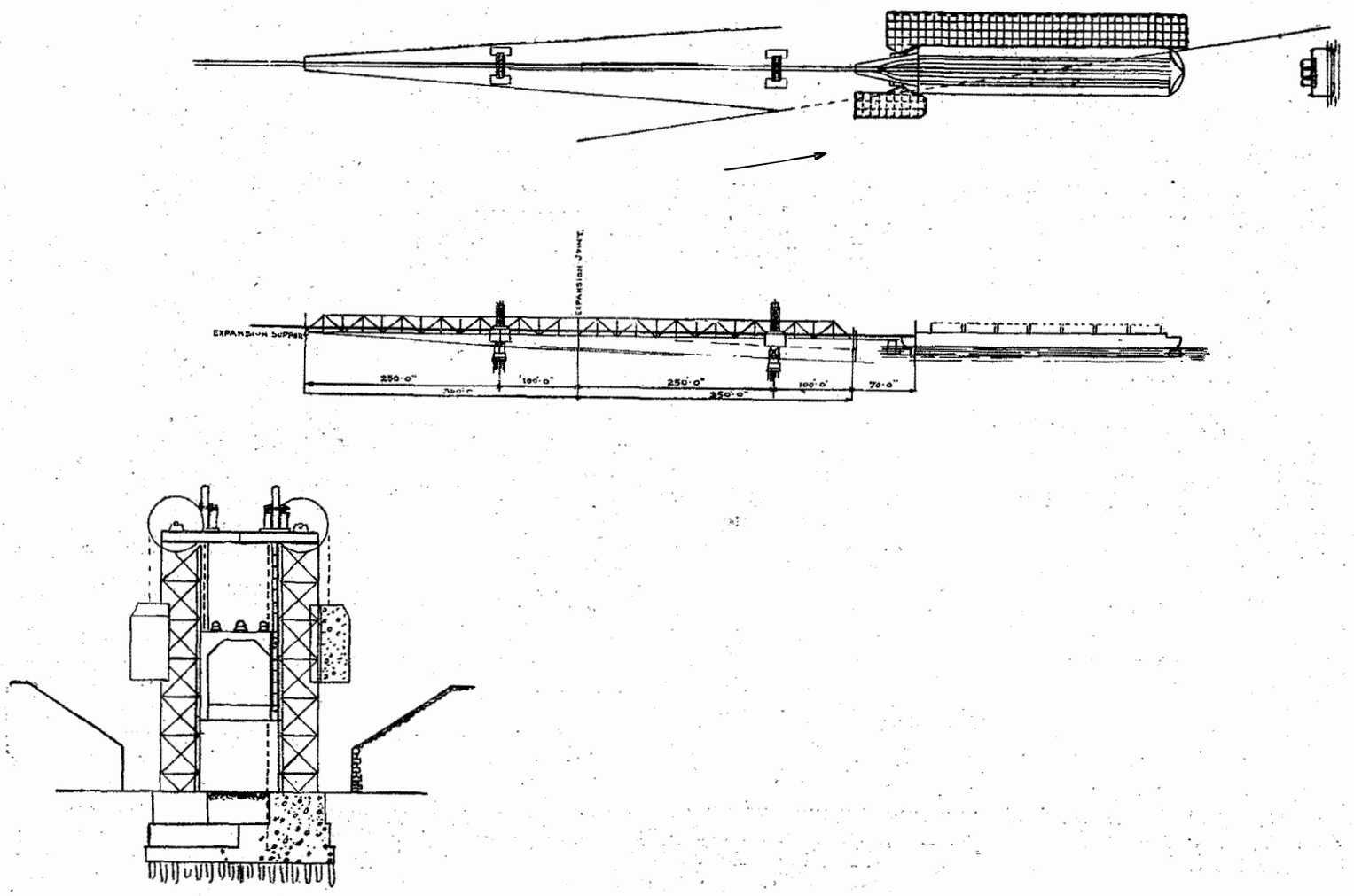
The new scheme is a train-ferry with a movable incline. The details are explained as follows:

1. *Ferry boat.* An ordinary ferry boat with three or four tracks on deck may be used. There is no special equipment on the ferry; it may be operated either by its own power or by a tug boat. The construction is therefore very simple.

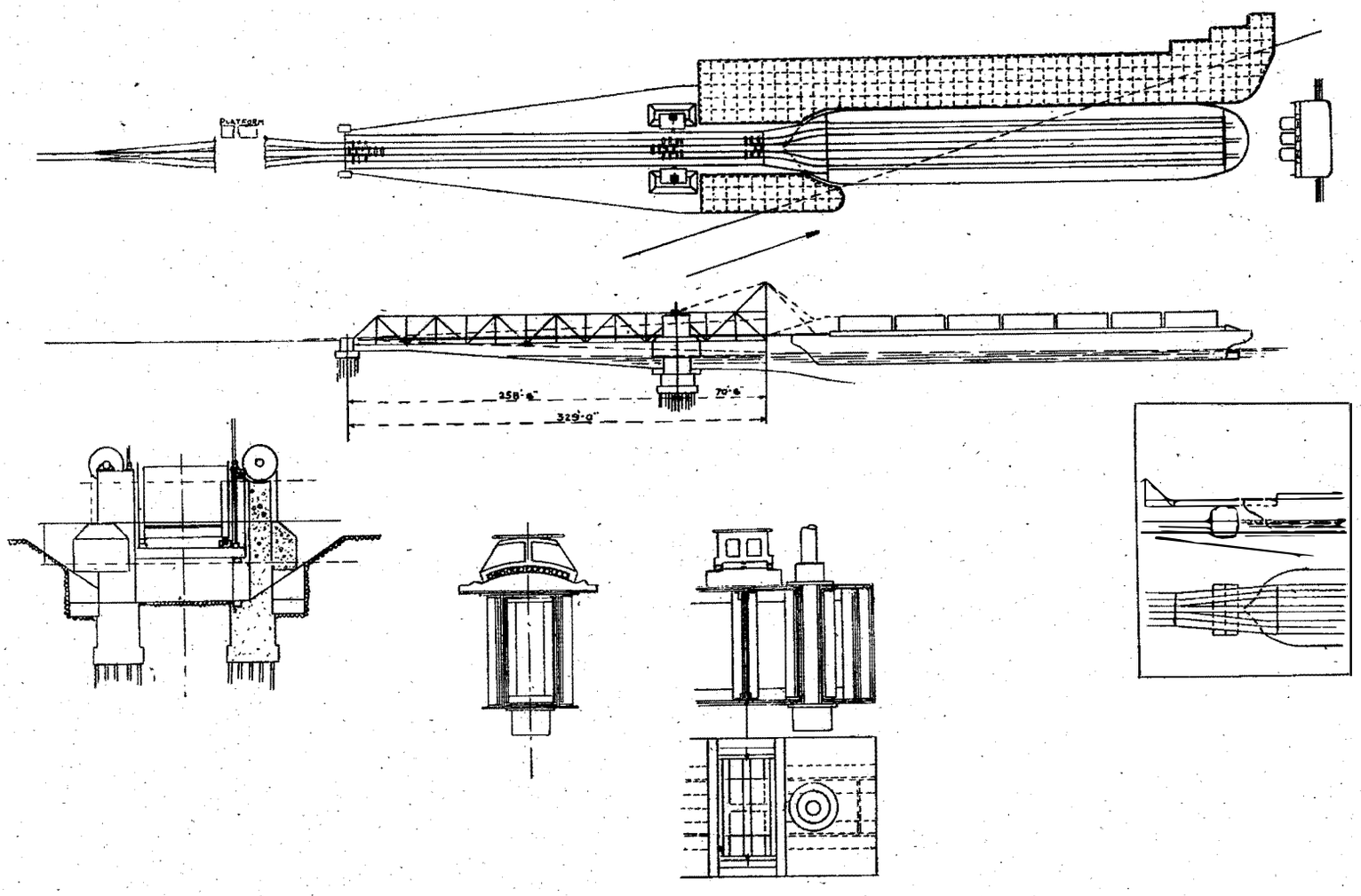
2. *Movable incline.* This is made in the form of a steel bridge, one end of which is hinged and the other end can be lifted by means of big screws resting on piers. The dead load is counter-balanced by counter-weights, the same as vertical lifting bridges. If there is no change in water level, it will remain in position. It is provided with a floating gangway, which by means of its change of slope, will take care of slight variations. This bridge can be raised or lowered either by an electric motor or by hand power, as the dead load is already counter-balanced.

3. *Loading and unloading trains* is done by a shunting locomotive with racks. The weight of the locomotive should not exceed the weight of the heaviest freight car, so that the locomotive can go on the ferry whenever necessary. Rack locomotives are the same as ordinary shunting engines, except with gears to work on racks. In this way, the tractive force on the incline does not depend upon the friction on rails, which renders the locomotive very safe on high grades. On level tracks, however, they will take the place of ordinary shunting engines.

4. *Grade.* With rack locomotives, a 4 per cent. grade will be safe for the incline. This is more so, as the deepest grade occurs only once a year within only a short period. To change to a lighter



PLAN OF TRAIN-FERRY BETWEEN HANKOW & WUCHANG.



PLAN OF TRAIN-FERRY BETWEEN HSIAKWAN & PUKOW

grade will slightly increase the construction cost. Such details can be decided upon when the scheme is adopted.

5. *The wharf* is to be at an angle with shore line so as to reduce construction work in the river, and with the further advantage that it will not have the danger of scouring and possible damage by boats. There will be occasional dredgings to maintain a sufficient depth of water for the train-ferry.

6. *The location of the wharf* should be in front of the present station. Back shunting on both stations should be avoided by using curved platforms. On the Hsiakwan side, the train should enter the Nanking station at a curved platform and then directly go to the wharf without back shunting. The writer has personally visited these places and found such could be done without incurring excessive expenses.

7. *Train.* The track on shore is to be at the level of the highest water level. No part of the track will then be under water at any stage. The track on the ferry is twelve feet above the water level. The movable incline will be able to rise twelve feet and descend thirteen feet, which is equal to the maximum difference of high and low water levels.

8. *Estimate.* The train-ferry will cost approximately $600,000 each ; the movable inclines, about $650,000 ; the wharves, about $700,000 ; and miscellaneous expenses, $200,000. The total cost is about $2,750,000, exclusive of land required.

To have a train-ferry service for Wuchang-Hankow is even more difficult than to have one for Nanking-Pukow, because at Wuchang-Hankow the difference between the high and low water levels is nearly fifty feet. Although it is not impossible to build a bridge across the Yangtze River at this locality, yet the train-ferry is cheaper and for years to come will be able to handle economically the traffic of the present growth.

The proposed design for a train-ferry between Wuchang-Hankow is somewhat different from the one that is for Nanking-Pukow and the differences are as follows :

1. There will be only one track on the movable incline instead of three, and one special three-way switch on the floating gangway. The reason for this modification is to reduce the weight of the bridge which has to be rather long.

2. In order to compute stresses more definitely the towers are to be made of steel which may be encased in concrete to prevent rusting.

3. The expansion support is not on the tower. The bridge is definitely fixed horizontally at this point. The towers are designed to take the thrust.

4. The raising or lowering of the bridge is similar to the vertical lift bridges, that is, by the pulling of ropes, instead of turning the big screws.

5. The live load is taken by the built-up member of the structure with a number of pin holes every three feet apart. The bridge will be hinged for every three feet of difference in elevation. For finer adjustments, however, the hinge on the overhead girder is resting on an oil cushion, similar to a water jack. The oil runs in while the hing is raised and is automatically cut off when the hinge is lowered. In this way, the bridge can be adjusted to any elevation of a slight degree.

6. The incline will be 700 feet long to be divided into two sections, or if preferred, it may be 1,000 feet long and divided into three sections, each of which can be easily raised or lowered. If the difference in water levels is about ten feet, only the section next to the river is to be raised or lowered, and the other sections are to be moved only for greater differences in water levels, say twenty feet and above.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

MANCHURIA—THE DANGER SPOT OF ASIA

THE EXTRATERRITORIALITY COMMISSION

JAPANESE FINANCE AND TRADE

THE PORT OF TSINGTAO

IRON, COAL AND MINERAL OIL ON ASIATIC COAST OF PACIFIC OCEAN

MACHINERY MANUFACTURING INDUSTRY IN JAPAN

STATE RAILWAYS OF THE NETHERLANDS EAST INDIES

ECONOMIC DEVELOPMENT OF FRENCH INDO-CHINA

THE MANILA RAILROADS

IRON IN THE PHILIPPINES

Vol. XXI December, 1925 No. 12

SHANGHAI, PEKING, TOKYO AND MANILA

上海仁記路拾六號

遠東時報

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SHIPS
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MACHINE TOOLS
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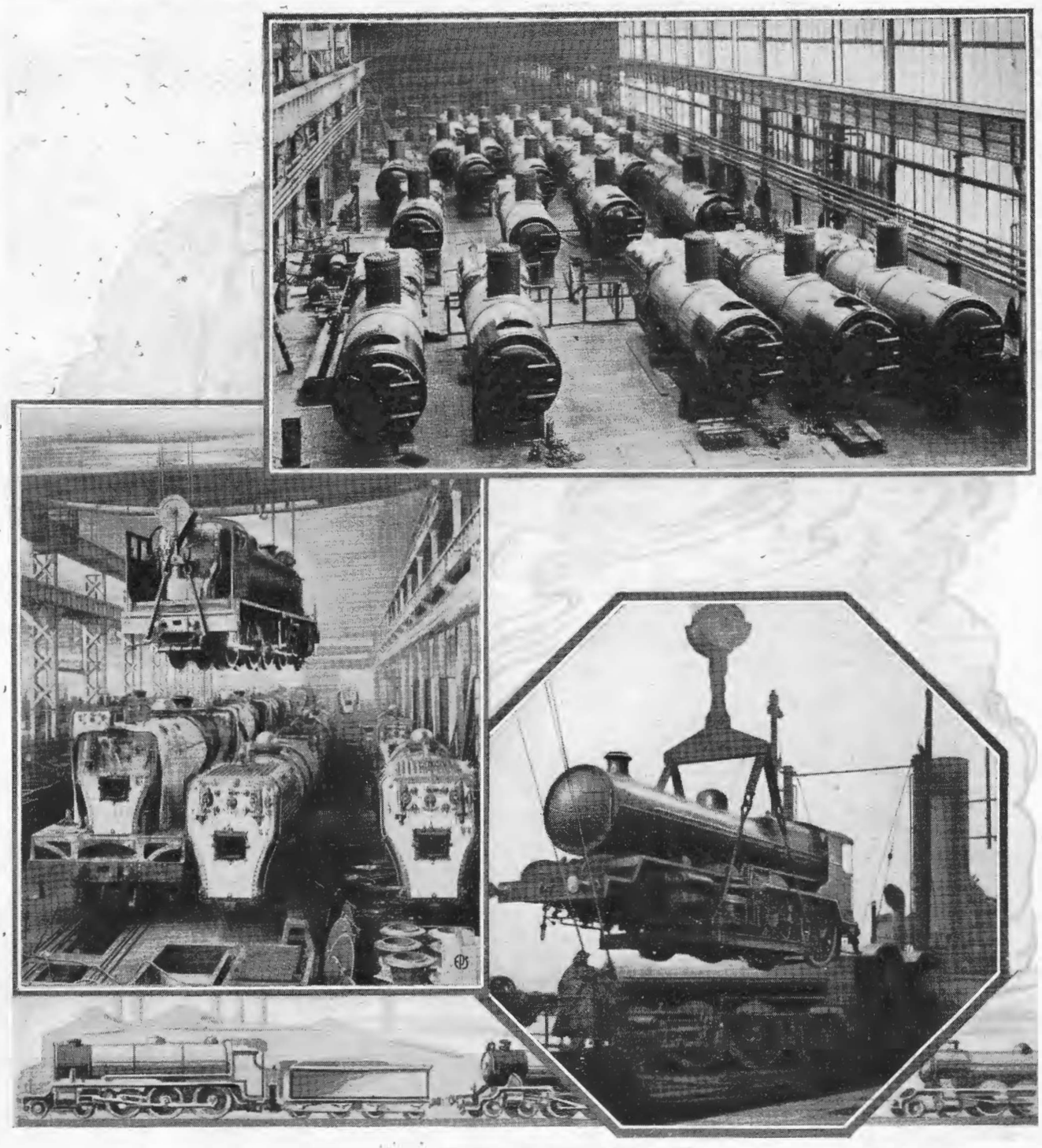
NON FERROUS PRODUCTS
DROP STAMPINGS
HIGH SPEED STEELS
SMALL TOOLS GAUGES
PNEUMATIC TOOLS
ELECTRIC LIGHTING SETS
ROAD MAKING MACHINERY
HYDRAULIC MACHINERY
HYDRO ELECTRIC PLANT
CIVIL ENGINEERING
GENERAL ENGINEERING



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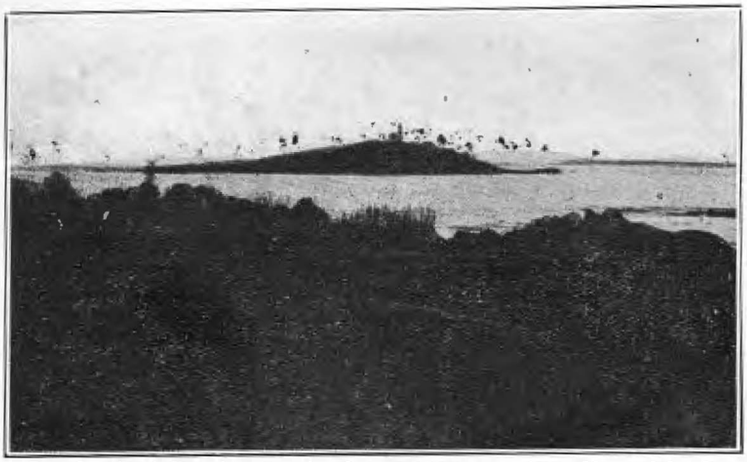


Bay South of City showing the Original Tsingtao (*Tao Means Island*) with Light House

Steel Pier in South Bay, formerly used by Germans for their Naval Department Entirely. Looking straight up Shantung Road, Lu Ta Mining Co. Office on Right

The Port of Tsingtao: its Harbor and Wharf Administration and Trade

Jick G. Wong, M.A.C. and A.E.

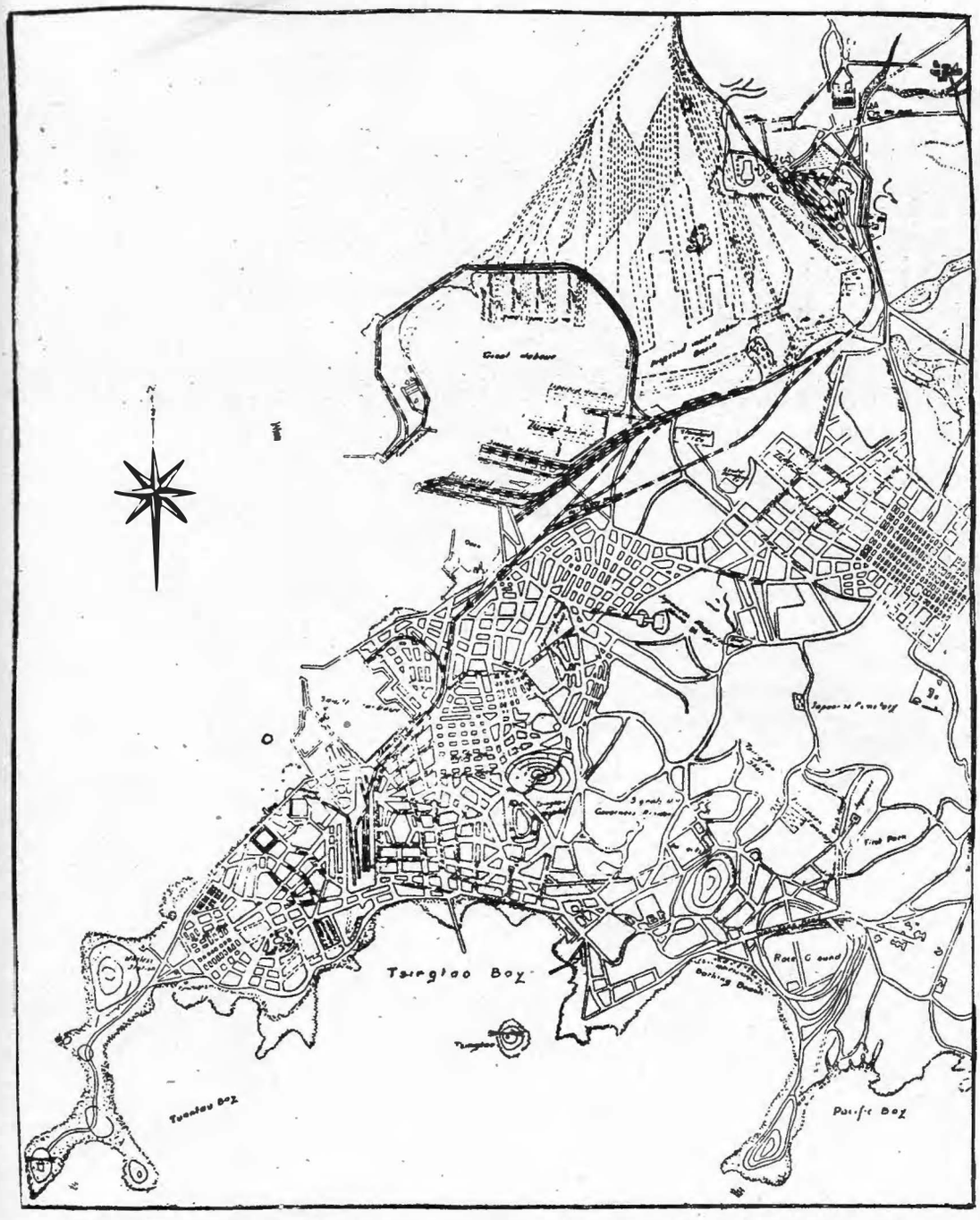
THE Port of Tsingtao occupies an unique position as it is the natural gateway of the Province of Shantung. It is the terminus of the Kiaochow-Tsinan Railway which runs through the heart of the Province, passing through rich agricultural districts and having branch lines reaching into the coal fields. The Railway connects with steamers, thus direct transportation by land and sea is facilitated. Tsingtao, although not so well known as Shanghai as a port, is nevertheless one of the best commercial ports China possesses, being situated on the peninsula which projects into the deep and wide Kiaochow Bay, sheltered on its northeast by the Laoshan Range and surrounded on the south, east and west by water. Being so situated its suitability for a harbor is unequalled. The climate is favourable all the year around and the temperature through the different seasons is averaged at about 55 degrees Fahrenheit. Its healthy atmosphere and scenic views are not to be found elsewhere along the coast of China.

The Harbor Construction

Germany had long sought to have a centre for her trade in the Far East so when she managed to secure the lease of the Kiaochow Territory from China in 1898 serious consideration was given for the development of Tsingtao in view of the natural facilities by land and easy access by water which this port possesses. Previous to the despatch of the German Squadron to the East (1897) the famous Harbor Engineer Georg Franzius, Builder of the Bremen Harbor was sent to Tsingtao to study in detail the water course, depth of water, tidal current, wind direction, topographical and geological aspects. Franzius's plan forthe construction of the harbor was adopted by the German Government. According to the plan advantage was taken of the places where reefs and islets were found for the construction of the long break-water which was accomplished at comparatively small expense in spite of the magnitude of the work. This break-water not only protects the harbor from the strong northwest wind which is a regular visitor of the Kiaochow Bay, but also prevents the mud silt from coming into the harbor, which heretofore flowed from the mouth of the Yellow River during the southeast monsoon season and occasioned many afflictions to Kiaochow. At the wharves and along the bund are warehouses, railway tracks, cranes and all necessary equipments for the future development of trade, all these evince the efficiency of and great pains taken by those who studied and planned such momentous work in those days.

150 Ton Electric Crane on Wharf No. 4

As a result of the careful working out of the plan of the above mentioned break-water the current which was heretofore swift at the entrance of the harbor has been made to flow gently. The harbor entrance and the position of the wharves have been so arranged and at such angles as to make the handling of ships easy. Up to the present no accident has occurred. Although this may



Plan of Tsingtao Showing Area of Reclamation Project for the Proposed Coaling Piers and Freight Terminal

(It is proposed to reclaim areas "A" "B" and "C" by 1930 in order to provide facilities for the exportation of 1,200,000 coal)

be due to the alert handling by ships' officers, still a great deal of credit must be attributed to the skill and attention of the engineer who planned for the construction of the harbor.

The harbor together with the wharves were completed in 1906 at a cost of 30,000,000 marks. The following figures gives some idea of the size of the harbor :—

(*a*)	*Break-water ;*	Great Harbor, 2,990 meters × 20 meters. Small Harbor, 586 ,, in length.
(*b*)	*Entrance ;*	Great Harbor, 269 ,, wide. Small Harbor, 100 ,, ,,
(*c*)	*Water Area ;*	Great Harbor, 1,550.00 square paces. (or 1.16 sq. mile) Small Harbor, 136,000 square paces. (one pace=5 Chinese feet)
(*d*)	*Depth of Basin ;*	Great Harbor, mean 31 feet. Small Harbor, ,, 19 ,, (in vicinity of floating pier)

The Small Harbor is used mainly for Chinese junks, small steamers and launches. The Great Harbor is deep enough for ships drawing eight meters at the neap-tide. The mean difference between high and low water is 12 feet.

Having foreseen the importance of Tsingtao as a trade centre and the Kiaochow Bay as a strategic naval base for her Far Eastern Squadron, the German Government spared no pains in fortifying the port and in developing the harbor and wharves.

Wharves No. 1 and No. 2 could accommodate 12 steamers of 6,000 tons each at one time, while on these two wharves are built seven warehouses with a capacity of 60,000 tons of cargoes. There was originally a floating dry dock of 16,000 tons capacity but was later taken to Japan after the Japanese got control of the port. The berthing quay line of the various wharves and piers are as follows :—

1st Wharf, 766 meters.
2nd Wharf, 1,111 meters.
3rd Wharf, 186 meters. (for inflammable cargoes)
4th Wharf, 1,175 maters. (for salt, coal and ores)
Wooden pier, 123 (for launches).
Small Harbor, 2,455 meters. (for junks)
Floating Pier, Small Harbor, 75 meters (for minor steamers)

The Wharf wall has a section of four meters wide from top to bottom with perpendicular faces, and at each spacing of ten meters along the wall are placed fenders while iron mooring posts and extrafloating fenders are placed every forty meters. The mooring posts, being built of strong material, have been regarded as superior in quality to all others found elsewhere in China.

The godowns along the harbor and the warehouses on the wharves are built of brick with galvanized iron plates for roofing. They are all properly designed with plenty of light and ventilation.

On Wharf No. 4 there is a stationary electric crane of 150 tons capacity for the loading and unloading of bulky and heavy cargo of over 30 tons. Besides thisc rane there are two floating cranes, one of 30 tons capacity and one of 22 tons capacity. There is also one car crane of 4 tons capacity.

The water supply equipment consists of 24 hydrants for the four wharves, each hydrant has a capacity of about 15 kilolitres per hour. On wharves No. 1 and No. 2 there is a total of 12 telephones so arranged as to be easily connected with ship telephones. For goods stored in open spaces the Wharf Office has 344 pieces of canvas for protection against rain.

Three steam launches are provided for mooring and towing purposes, the largest being of 134 tons while the smallest 64 tons. For general purposes four other small launches are maintained, the largest being 16 tons and the smallest 5 tons. One lighter made of steel of 200 tons capacity is used for carrying bunker coal.

Storing ground is as follows :—

(*a*) Coal storing ground, capacity about 63,000 tons.
(*b*) Salt storing ground,
At Great Harbor, capacity about 4,000 tons.
At Small Harbor, capacity about 15,000 tons.
(*c*) Ore storing ground, capacity about 30,000 tons.

Storing ground is as follows :

(*d*) Ground for lease at Great Harbor, about 55,000 square paces.
(*e*) Ground for lease at Small Harbor, about 18,000 square paces.
(*f*) Storing ground on Wharf No. 1, 1,466 square paces.
(*g*) ,, ,, No. 2, 8,338 ,, ,,
(*h*) ,, ,, No. 3, 1,049 ,, ,,
(*i*) Temporary storing ground at Small Harbor, about 10,125 square paces.

The seven warehouses on Wharves No. 1 and No. 2 have a total area of 9,157 square paces, while there are 20 warehouses and godowns along the water front having a total area of 7,618 square paces. (one pace=5 Chinese feet).

Equipment for the moving of goods consists of 15 miles of railway sidings, 3 miles of light railway, 110 cars, 119 large carts, 8 heavy carts and 390 minor carts. The railway tracks run on all four wharves so that loading and unloading of cargoes can be made direct from steamers to cars or *vice vresa*.

The number of wharf coolies for the general moving of cargoes average from 1,000 to 3,000 men, each capable of working about 3 to 4 tons per day of ten hours. The Tsingtao Wharf Corporation Stevedores, and T. Adams & Co. provide the coolies. The Stevedores get their money from the Harbor and Wharf Administration which collects from the shipping companies for tonnage of cargoes moved. There are sufficient coolie quarters provided by the various Stevedores to accommodate about 1,500 men.

Besides the above mentioned equipments and facilities for the handling of cargoes there are numerous light-houses, buoys, fog-sirens, beacons, whistling buoys, etc. for the safety of navigation within the harbor.

The Administration of the Harbor and Wharves

The administration of the harbor and wharf affairs has gone through various steps before arriving at the present system. The following were the various changes made due to the changes in control of the port.

At the beginning the Wharf Office personel consisted of only four Germans. Then the business was simple, as it did no other direct wharf business except examining the account books of the companies which paid wharf dues and assigning berthing space to the various steamship companies. The Harbor and Wharf Administration is now organized as follows :

DIRECTOR

ASSOCIATE DIRECTOR OR HARBOR MASTER

Department of General Affairs :
- Archivés and Documents Division.
- Miscellaneous Work Division.
  - Repairs for workshops. Stores for supplies.
- Accounting Division.
- Statistical and Auditing Division.
- Inspecting Division.
- Branch Office at Small Harbor.

Department of Wharf Affairs :
- Stevedore Division.
  - The third Wharf. The fourth Wharf. Tool Stores.
- Shipping and Landing Cargo Division.
- Warehouse Division.
  - Custody Warehouse.
- The First Wharf.
  - A-Warehouse. B-Warehouse.
  - C-Warehouse. D-Warehouse.
- The Second Wharf.
  - F-Warehouse. G-Warehouse. H-Warehouse.

Department of Harbor Affairs :
- Marine Division.
  - Tsingtao Flag Station and Great Harbor Flag Station.
  - Steam Launches,—The Saturn, The Uranus, The Pole Star, Sa Shu Chuan.
- Signal and Equiping Division.
  - Tcha-lien-tao Light House.
  - Tai-kung-tao Light House.
  - Yu-nie-shan Light House.
  - Horse-shoe Reef Watch-house.
- Ship Mooring Division.
  - Tugboats,—The Venus, The Jupiter, The Mercury, The Neptune.

Department of Engineering Affairs :
- Civil Engineering Division.
  - Cement Brick Factory.
- Mechanical Engineering Division.
  - Engineers' Office Steam Launches.

Revenues and Expenditure of the Harbor and Wharf Administration

The charges collected by the Harbor and Wharf Administration are : for towing, working cargoes on board and on wharf, stevedore charges, wharfage fee, storage, warehousing, ship repairs, etc. The total revenue collected for 1923 amounted to $1,047,326 while the expenditure for the same year was about as follows :

To salary of staff	$ 295,672
,, material for light-houses	3,000
,, coal	34,000
,, repairing quays	960
,, machineries	1,200
,, office equipment	8,000
,, other materials	4,800
,, miscellaneous	32,368
,, working cargoes, stevedore	315,000
Total amount paid out	$ 695,000
Surplus for 1923	352,326
Total	$1,047,326

The returns for 1924 shows that the revenue has increased by about 20 per cent. to $1,203,718. At present the Administration has plans for the extension of Wharf No. 1 and the construction of a dock yard but as these two works would cost several million dollars nothing definite can be done as the annual surplus has been allocated for the up-keep of the Directorate-General and for meeting deficits occurring in other Departments of the Port Administration.

Relation Between Wharf and Railway

As stated in a previous paragraph the Wharf Office was under the Railway management during the Japanese occupation, but now it is a separate organization so frequently the Railway encounter great difficulties in the transferance of freight. Accordingly with the idea of doing away with the present inconveniences the Railway Authorities have negotiated many times with the Wharf Administration but so far nothing definite has been accomplished toward the solving of the problem. The best plan would be for the Railway to take over the management of the wharves. The Railway could pay the Port Administration a lump sum at fixed periods. Obviously such an arrangement would effect great saving in the administrative expense which would be used for the future extensions and improvements necessary to meet the expected increase in the volume of trade. Having control of the wharves the Railway could then make definite plans for the development of the wharf facilities which would bring great benefits to both the Railway and the merchants in the increased speed in moving cargoes. As the volume of traffic carried by any Railway is more or less governed by the capacity of the terminal facilities the Railway must try every means to get control of the wharves, or to have the power in deciding and carrying out all improvements and extensions necessary for the handling of the future increase in trade which is bound to come.

A Plan for the Extension of the Terminal Facilities

" The volume of traffic which a line would carry cannot exceed the capacity of the terminal " is more true to our Line than to any other as the amount of goods exported from this port is very great, especially with regard to the exportation of coal. Mr. T. Ohmra, Traffic Manager of the Kiaochow-Tsinan Railway, a prominent Japanese Engineer and former Adviser to the Ministry of Communications, estimates that by 1930 the coal production along the Kiaochow-Tsinan Railway will reach 2,460,000 tons of which about

one-half of this amount would be for export. The Tzuchuan Colliery is expected to produce over 1,400,000 tons while the Poshan, Takunlun and other mines to produce about another 1,000,000 tons annually. In order to handle this amount of coal for export it is of the utmost importance to provide a storage yard sufficient in size to store at least the amount of coal for one month so as to meet fluctuation of the water and rail transportation. The area of such a storage yard must be at least 200 *mows*. (one *mow* = 6,000 Chinese square feet).

Besides the storage yard, means must be provided for the transhipment of coal from the coal piles to the steamers. Accordingly it is proposed to reclaim the portion "A," "B," and "C," making an opening through the break-water of 600 feet wide and using lighters to approach the coal piles. The areas "A," "B," and "C" to be protected by a masonry bulk-head which would give sufficient berthing space for more than 20 lighters of say 80 tons each in capacity at one time. It will then be possible to load 5,000 tons of coal in one day to five steamers anchored in the harbor. It is estimated that about 1,000 tons per day by means of lighters can be handled. This would meet the requirement of exporting 1,200,000 tons per year. The cost of reclamation of "A," "B" and "C" with bulk-head, tracks, bridges, etc. is estimated as follows :—

Reclamation with bulk-head	$1,176,000
Tracks, 10 km. using old 60-lb. rails	100,000
Bridges and buildings	250,000
Signals and safety appliances	35,000
Total ...	$1,561,000

The bridge across the cut in the break-water would be only a temporary structure until the whole reclamation scheme is completed, then the bridge would not be required. For rental of the coal storage yards resulting from the reclamation of "A," "B" and "C," it is estimated to bring in a revenue of about $100,000 besides which there would be the usual charges for berthing space, loading, etc.

The Germans certainly had great foresight in building the Kiaochow-Tsinan Railway for if one will study the map of China it is at once apparent what immense possibilities there are for the future of this Line with its vast hinderland and sea-port terminal. Had it not been for the Great War the Germans no doubt would have long extended this Line westward into the coal fields of Honan and Shansi Provinces. The Peking Syndicate owning the coal mines in Honan and operating the Tao-Ching Railway had long sought to connect the eastern terminus of the Tao-Ching Railway with Tsinan thereby giving them the shortest route to sea. From Tsinan to connect with the Tao-Ching Railway is only a stretch of about 200 miles through a practically flat country. The cost of this connecting line should not exceed $20,000,000 Mex. When this connection is made the Tsingtao terminal must be enlarged to meet the conditions required for the exportation of coal. Accordingly it is proposed to reclaim the portion of the Kiaochow Bay north of the break-water and build the four coaling wharves as shown in plan. The completion of such a scheme would give sufficient facilities for the handling of the coal coming over the Kiaochow-Tsinan Railway when the Railway is fully developed.

The principal products of Shantung are those from mines and farms, consequently the amount of trade in this Port varies with the season. The busiest time of the year for exports begins with November and ends at the beginning of June of the following year. During this period the harbor activities present a very lively scene. The principal exports are coal, cokes, salt, groundnuts, groundnut oil, iron ore, ore, eggs, tobacco leaf, soft-wood, etc. In 1922, 382,858 tons of coal were brought to the wharves by the Railway. Other items were, 22,817 tons coke, 40,320 tons iron ore, 15,490 tons groundnuts, 1,978 tons of tobacco leaves, 1,064 tons of dyestuff, and 4,334 tons of wheat bran. At Erh-Shih-Li-Pu, a station on the Kiaochow-Tsinan Railway and 178 kilometers from Tsingtao, the British-American Tobacco Company has a large plant for the collecting and curing of tobacco leaves. The tobacco company gives every help to the farmers in the cultivation of tobacco which is very suitable for the soil of the district mid-way between Tsingtao and Tsinan. In view of the greater value of the tobacco crops over the ordinary farming products it is likely that more and more tobacco will be cultivated in this region. The principal imports are raw cotton, cotton cloth, cement, cotton yarn, iron, machinery, wood and planks, match material, kerosene, mats, etc. Of the imports the principal items carried by the Railway were as follows for 1922 :—iron plates and iron ware 16,904 tons, kaoliang 85,072 tons, woods 27,216 tons, cement 7,896 tons, raw cotton 7,544 tons, coal pitch 7,151 tons, kerosene 5,817 tons, cereals 5,054 tons, match material 4,079 tons, cigarettes 3,383 tons, brooms 3,253 tons, and cotton yarn 1,696 tons. The large importation of kaoliang was an unusual thing for this harbor but brought about by the breaking down of the transportation system of the Peking-Mukden Railway caused by the Chihli-Mukden War in 1922.

The Kiao-Au Administration

The former German Leased Territory of Kiaochow which passed to the control of Japan during the Great War was returned to China as a result of the Washington Conference. After taking back the Kiaochow Territory from Japan the Chinese Government established the present Kiao-Au Administration with a Director-General at its head for the administration of the affairs within this territory. All public utilities such as water works, harbor and wharf facilities, electric works, telephone system, etc. having been built by the German Government and later extended by the Japanese became the properties of the present Administration. Consequently the management of these public utilities form several Departments of the Kiao-Au Directorate-General. In the Treaty between China and Japan for the retrocession of the Kiao-Au Territory it was stipulated that 20 per cent. of the Customs receipts shall be allocated to the Directorate-General for the maintenance and improvements of the Port of Tsingtao. The Customs remaining under control of the Central Government with its foreign Inspector-General on account of the foreign loan obligations. For 1923 the Customs' contribution amounted to over $400,000.

The following figures show the Budget of the Kiao-Au Administration for the year 1924. At the present writing the actual figures could not be obtained, only the figure for the total receipts of the Harbor and Wharf Office available being the amount of $1,203,718 for 1924.

1924 Budget of the Kiao-Au Administration

Revenue :			
Harbor and Wharf Office			$1,000,000
Water Works Office			288,000
Telephone Office			250,000
Agricultural and Forestry Bureau			24,000
Contribution from Customs (20 per cent.) ...			460,000
Finance Dept. (taxes)			
Land rentals	$400,000		
Ground tax	100,000		
House rentals	100,000		
Business tax	20,000		
Vehicle tax	26,000		
Miscellaneous tax	15,000		
Sanitation fee	84,000		
Miscellaneous receipts ...	24,000		
		779,000	
Total estimated receipts			$2,801,000
Expenditure :			
Directorate-General			$ 240,000
Police Dept. (including water police)			530,000
,, ,, uniforms			50,000
,, ,, Sanitation Division			70,000
Harbor and Wharf Office			695,000
Water Works Office			120,000
Telephone Office			120,000
Finance Dept.			80,000
Public Works Office			325,000
Educational Bureau			100,000
Agricultural and Forestry Bureau			68,400
Bureau of Foreign Affairs			40,000
Pu Chi and Li Tsun Hospitals			34,800
Military and Naval Establishments and Courts			80,000
Observatory			20,000
Chemical Research Dept.			30,000
Commercial Museum			6,087
Official Gazette			12,000

Isolation Hospital	$ 22,000
General Miscellaneous	240,000
Total estimated expenditure ...	$2,883,287

In closing perhaps it would not be out of place to give a little description of the City of Tsingtao. It is well laid out, very much like any coast town one would find in any European country. The streets which are well lighted, are wide and having broad sidewalks. The principal streets have sheet asphalt covering, while streets on steeper grades are all paved with granite stone blocks. The architectural effect is principally German, interposed with foreign style houses built by the Japanese. There is a modern sewage system and every house has its flush-closet. The houses here are not like those of other cities where they are generally surrounded by a compound wall. The principal attractions are the fine beaches, perhaps the best in the Far East, excellent motor roads, and attractive parks and boulevards. In the summer months people from all over China come here for their summer holiday. During the Japanese occupation the Forest Park was planted full of cherry trees so each year at the end of April hundreds of people from nearby towns as well as the residents of Tsingtao fill the Park to enjoy the beautiful scene of the cherry blossoms and this Cherry Blossom Festival which the Japanese started is being kept up by the present Administration. The hills surrounding Tsingtao are covered with motor roads besides there is a fine motor road of over 38 kilometers leading to the top of the Laoshan Mountains. The Grand Hotel Company operates two large hotels, the Grand Hotel and Annex situated in the centre of the residential quarters and the Strand Hotel at the principal beach. The most imposing building is the present Directorate-General which is of granite construction and contains over 160 large rooms. It was built by the Germans and used as their seat of Government. This buildings, together with the many forts on the hills and around the Bay, reminds one of the former greatness of the Germans and their thoroughness in any undertaking. The population of Tsingtao for 1923 was estimated as follows ;—

Chinese	276,700
Japanese	16,800
Other foreigners	430
Total	293,930 (approx)

Taking everything into consideration it is seen that Tsingtao, with its fine and well laid out streets and its superb harbor and excellent wharf facilities, is destined to play an important part in the development of not only Shantung Province but that part of China between the Lung-Hai and the Chung-Shih Railways, and its degree of prosperity will indicate the progress of development in this part of the Country.

Recent Interesting British Launchings

THERE have recently been several very interesting launchings of vessels destined for the Eastern trade, in England, among them being the Alcinous for Messrs. Alfred Holt & Company, the Sirdhana for the British India Steam Navigation Company, Limited, for their regular service and the Malabar for Messrs. Burns, Philp & Company, Limited of Sydney, for their service between Australia, New Guinea, and the Islands of the Pacific. The following are brief particulars of the several vessels.

Alcinous

The Alcinous was launched from the Cartsdyke Shipyard of Messrs. Scott's Shipbuilding & Engineering Company, Limited, Greenock on October 6. She is a twin-screw motor-ship, built for the passenger and cargo service of Messrs. Alfred Holt & Company. The dimensions of the vessels are 425 feet long by 54 feet 6 inches wide by 31 feet 9 inches in depth, with a gross tonnage of about 6,300 tons. The vessel is equipped with 20 powerful electrical winches for the rapid handling of cargo, and complies in every respect with the latest requirements of the Board of Trade and Dutch authorities for passenger carrying, including emergency dynamos, boat-turning-out gear, etc. The life saving equipment consists of 12 large life boats, two of which are fitted with Fleming's patent hand-propelling gear.

All the weather decks are sheathed, and the conveniences for the type of passenger carried are of a very high order. An interesting point in connection with the design of this vessel is that she is the first of Messrs. Alfred Holt and Company's fleet to have the machinery placed at the after end.

The vessel is propelled by two sets of eight-cylinder four-cycle Diesel engines, supplied by Messrs. Burmeister and Wain, of Copenhagen. These engines develop about 3,700 b.h.p. under normal running conditions. The engine room auxiliaries are all electrically driven, as are the deck machinery, steering gear, and refrigerating plant. To supply power for these and also for lighting and cooking purposes four auxiliary Diesel engines, each direct coupled to a dynamo, are fitted in the engine room. In addition to these there is an emergency dynamo situated on the centre castle deck. This supplies current to run the emergency pilge-pump, wireless telegraphy and certain lighting circuits in the event of the main electric units becoming totally disabled. An oil-fired auxiliary boiler is fitted in the engine room, and supplies steam for distilling, fuel-oil heating, etc.

Sirdhana

On October 5, Messrs. Swan, Hunter, and Wigham Richardson, Limited, launched from their Neptune Works a steel screw passenger and cargo steamer named the Sirdhana, which they are building to the order of the British India Steam Navigation Company, Ltd. The Sirdhana is similar to the Santhia, built at the same works for the British India Steam Navigation Company, Limited, which has been running satisfactorily on her service since the early part of the year. The steamer is built of steel with teak decks. She is 450 feet in length by 57 feet 9 inches broad by 36 feet 6 inches moulded, and is designed to carry a deadweight of 9,500 tons on a draft of 27 feet.

The machinery consists of twin-screw triple-expansion steam engines, which, with the boilers are also being constructed at the Neptune Works of Messrs. Swan, Hunter and Wigham Richardson, Limited, and are designed to propel the vessel at a speed of 13 knots. Amidships there will be comfortable well-finished accommodation for 30 first class passengers, including a large dining saloon on the bridge deck, with entrance hall, lounge and smoking room on the promenade deck above. There will also be excellent accommodation for 30 second class passengers on the same decks, including nine state rooms, a dining saloon and smoking room. Part of the upper deck and 'tween decks can also be used for carrying native passengers, up to about 3,000 in all.

The auxiliary machinery includes a steam windlass, steam steering gear, and 12 steam winches, together with the usual derricks, etc. There is electric light throughout. The refrigerating plant installed has been supplied by Messrs. J. & E. Hall Limited of Dartford. Bitimastic solution and enamel has been applied to bunkers, coal shoots, tank-top, boiler-room tank, bilges, shell plating, main inlet box, tunnel well, aft end of poop deck and water-way, upper and main deck stringer plates, as well as covering to the flat of deck plating. The ventilation will be very ample, as the vessel will trade in the Tropics, and there will, of course, be a wireless installation, a large number of steel lifeboats, steam heating, and refrigerating machinery, together with the necessary insulated store-rooms for the ship's provisions.

Malabar

The single-screw motorship Malabar, constructed by Messrs. Barclay, Curle & Company, Limited, for Messrs. Burns, Philp & Company, Limited, of Sydney, for their services between Australia, New Guinea, and the Islands of the Pacific, completed successful trial trips on October 9, the mean speed attained being 14 knots. After the trials the Malabar left for Avonmouth, from which port she proceeds to Sydney with passengers and cargo. Attending the trials on behalf of the owners were Viscount Inchcape and Mr. W. G. R. Snellgrove, whilst the builders were represented by Mr. Noel E. Leek, Mr. William Ewing, and Mr. Archibald Gilchrist.

(Continued on page 747.)

Volume XXII

Note: There are "Engineering Notes" in only the October - December issues with very limited mention of railways. Under Rea's editorship the journal continues with political bias.

January 1926
Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders.

February 1926
The Chinese Eastern Railway A report by Fisher Y.C. Yu on the redemption of the loans on this railway by the Chinese Government and the financial involvements.
Carnegie Steel Company Advertisement on rear cover for U.S.A.-manufactured railway track.

March 1926
The "Great Pacific War – The Wrath to Come Editor G. B. Rea in a long rant ridicules two British writers who had forecast a forthcoming great Pacific War with Japan.

April 1926
The Destruction of China's Railways Short article describing how for two years the militarists had treated the railways as their own private property. Railway carriages had been used as barracks and locomotives stabled by generals as if they were their own horses. Debts were not being met and the credibility of railways destroyed.
The Taonan-Tsisihar Railway A statement that the construction of this extension had resumed after ice had melted. 1 sketch map
Locomotives on Chinese Government Railways A report summarizing the numbers of locomotives operating on government lines. 6 photos of locomotives & 1 engineering drawing of an S.N.L 4-4-0 locomotive.

May 1926
The Construction of the Chinese Eastern Railway Company A historical account about the building of the CER from the Russian perspective. The article was written by A. Borissoff, an agent of former CER General Manager B. V. Ostroumoff.
Kirin-Tunghua Railway Report that the SMR was surveying for the proposed extension of the Changchun-Kirin line to Tunghua. 1 sketch-map.
The Peipiao Extension of the Chaoyang Branch of the Peking Mukden Railway. Report by H Stringer on the progress of construction of this extension line to Peipiao (*Beipiao*) which had reached Y-Hsien (*Yi Xian*) in late 1921. Photos and engineering sketches.

June 1926
The Chinese Eastern Railway In response to the Russian account of this railway's history (May edition), Dr C. C Wang in a long article, presents his case about this railway, which he suggests triggered first the Russo-Japanese War and then the Russian revolution.
South Manchuria Railway Advertisement for this line's fast connections with Chinese destinations.
SMR Advertisement for Fushun Coal
SMR Advertisement for Dairen Wharves

July 1926
Railway Struggle in Manchuria A report about how two northern provinces in Manchuria had escaped the unrest affecting the civil war raging in the rest of the nation. During this time construction of a number of new Chinese railway lines were started with assistance arising from complex relationships between local officials with both the SMR and the Russian CER, both of which were competing in the region. 1 map.

August 1926
The New Railways of Manchuria A summary of new railway development in Manchuria by the local Chinese officials, often with Japanese financing. One line, the Hulan-Hailun line was being built by Russian Mr. Ostroumoff, the former G.M of the CER. 2 maps showing new and proposed lines and a "Railway Map of China".

September 1926
Shanghai-Nanking Line An illustrated description of the SNR railway and its workshops. 8 photos.

October 1926
Hulan-Hailun Railway A description of a new line which was being surveyed north of Harbin. I map
Chinese Government and Provincial Railways Demand Open Hearth Steel. A report that demand for steel rails made by this process was resulting in orders being placed with U.S. steel manufacturers.
Engineering Notes:
S.M.R. Hotels The SMR company was planning to separate its hotel business from railway operations by forming a new company.
Refrigerator Cars in China The first refrigerator car had been placed in service on the Shanghai-Nanking Line. 21 cars had been ordered from Belgium for various Chinese lines.

November 1926
The Chinese Owned Railroads of Manchuria An article describing the railway building activities within the far eastern provinces of Manchuria by the local Chinese authorities, separate to other railway developments being conducted by competing Japanese and Russian interests. 1 map.
Engineering Notes:
Shanghai-Nanking Railway Surveys were being conducted with a view to building a branch line west of Changchow.
New Bridge at Mukden The SMR were building a new iron bridge at Mukden station.

December 1926
Ingersoll Rand Advertisement for pneumatic tools.

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

上海仁記路拾六號

THE SAVING OF MANCHURIA

NEW YORK CHAMBER OF COMMERCE PROTESTS AGAINST AMERICAN SENTIMENTALISM

AN END TO MALICIOUS PROPAGANDA!

FORESTRY IN KOREA

HIGHWAY CONSTRUCTION IN THE PHILIPPINE ISLANDS

NEW DIESEL-ELECTRIC POWER STATION AT SHANGHAI

INTERNATIONAL BRIDGE AT TIENTSIN

THE SUITUNG COAL FIELD

JAPANESE PETROLEUM PRODUCTION

Vol. XXII | January, 1926 | No. 1

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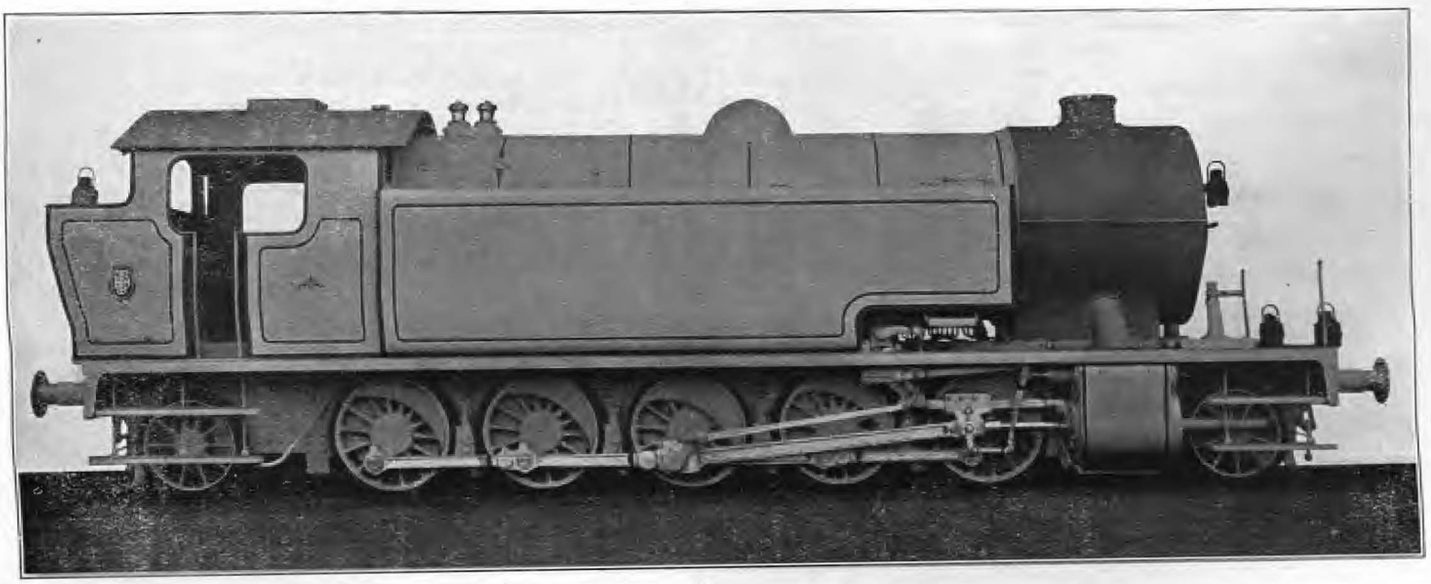


AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

The Yangtze River Boat, the "Fu-Shun" — page 85.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

JAPAN'S POLICY IN CHINA

THE INHUMAN IMMIGRATION LAW

TEXTILE SITUATION IN CHINA

THE POPULATION OF JAPAN

TRADE WITH CHINA

ECONOMIC RESOURCES OF MANCHURIA

CHINESE EASTERN RAILWAY

OSAKA HARBOR

DEVELOPMENT OF NAGOYA

Vol. XXII February, 1926 No. 2

SHANGHAI, PEKING, TOKYO AND MANILA

The Chinese Eastern Railway

Its Redemption by the Chinese Government

THE FINANCIAL INVOLVEMENTS

By Fisher Y.C. Yu

THE attention of the world is now drawn to the Peking Special Tariff Conference authorized at the Washington Conference, for the purpose of revising the Chinese Customs Tariff. The questions involved are undoubtedly important from the financial and the political standpoint. But what seems to me to be of greater significance than the increase of customs tariff or, perhaps, the restoration of the complete tariff autonomy—a question that has vast bearings upon the political, economic and social life of China and possibly the peace of the Far East—is the question of the Chinese Eastern Railway and its redemption by the Chinese Government. The present tariff conference is important in that it paves the way for the accomplishment of this vital end. But the importance of this question is at present so much obscured and so little appreciated that I consider it necessary to present the situation surrounding the Railway and to point out the significance thereof.

In the original contract between China and the Russo-Chinese Bank (now Russo-Asiatic Bank) dated September 8, 1896, concerning the construction and operation of the Chinese Eastern Railway, it was stipulated thus:

> ". . . At the expiration of thirty-six years from the day on which the entire line is finished and traffic is in operation, the Chinese Government will have the right to buy back this line upon repaying in full all the capital involved, as well as all the debts contracted for the line, plus accrued interest . . ."

As far as record shows, the entire line of the Chinese Eastern Railway connecting the Trans-Siberian line with Vladivostok across Manchuria together with the line south from Harbin to Port Arthur was completed in the fall of 1901. Accordingly, China may exercise her right to purchase the Railway in 1937, or twelve years from now.

It is the purchase of the Chinese Eastern Railway that our interest must be focused on and adequate machinery should be set up for its consummation.

The Issue Admits No Alternative

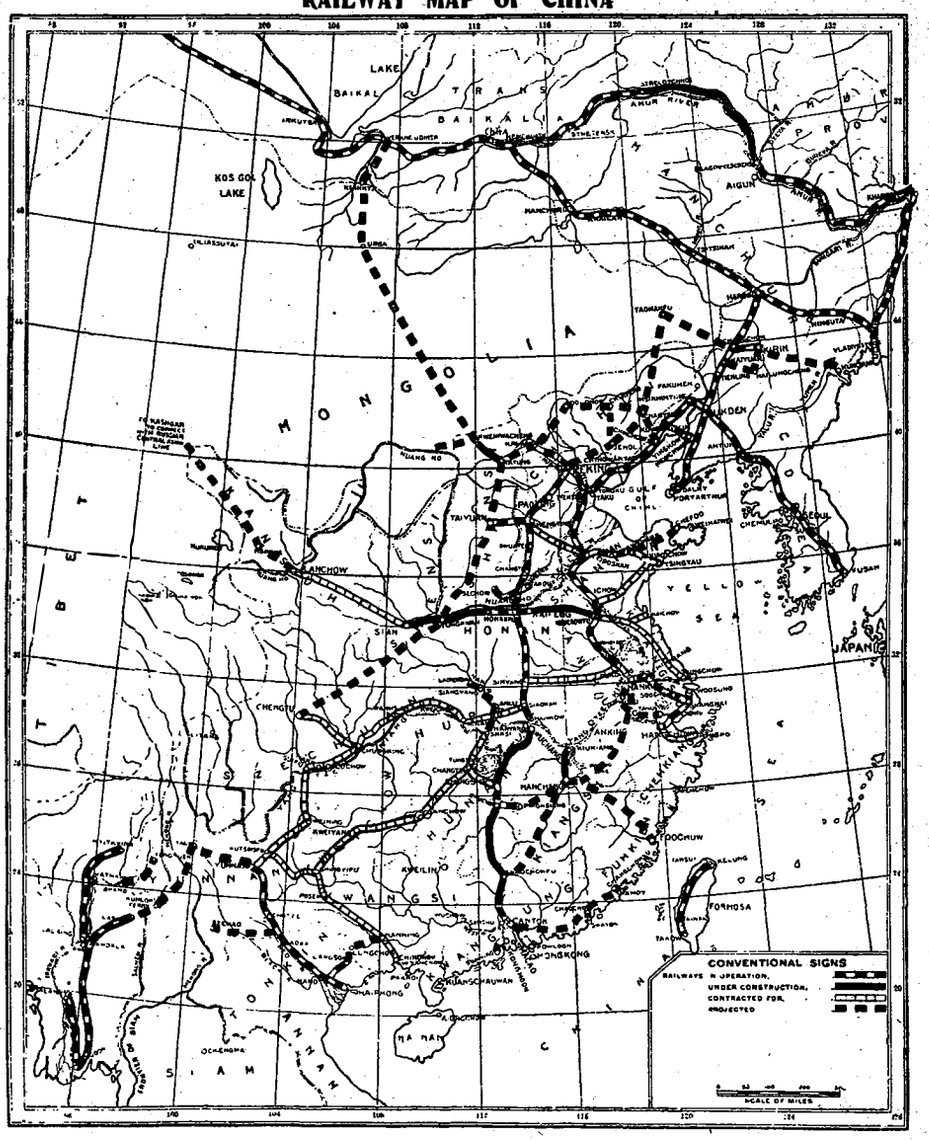
Section 29 of the Agreement defining the Statutes of the Chinese Eastern Railway Company provides for the gratuitous entrance into possession of the Railway by the Chinese Government after the expiration of 80 years of possession by the Chinese Eastern Railway Company. Should China elect to waive her right of redeeming the Railway in accordance with the option, she would, in theory, come into its possession free of all charges at the end of the present century.

In my opinion, no mistake could be more grave and fatal than that of relinquishing this valuable right, which was the only important reservation made in the interest of China in the whole agreement. If China wants to get back the Railway, she must exercise her right to buy it at the specified time; otherwise she will not have the remotest chance of obtaining its possession in the future. The question, as I see it, admits no alternative; the only wise and necessary thing for China to do is to get the Railway back by all means.

Russia's Recent Move

Recent developments tend to indicate that Russia, whose Far Eastern policy for the past 250 years has been that of the territorial and political aggrandizement at the expense of China, is making a renewed effort to strengthen her position in Mongolia and Manchuria. It is reported that the Soviet Government is making an arrangement with the Government of Outer Mongolia for the construction of a railway from Chita, Mongolia's capital, to Kulon, more than half way to Peking. This will enable Russia's coming into Peking independent of the Southern Manchurian branch of the Chinese Eastern Railway, which was ceded to Japan at the conclusion of the Russo-Japanese War. The agreement, as reported, provides for the same extensive privilege of buying and selling lands, of building houses and mining and felling timber within 100 versts of the railway, as well as the supreme control of the railway, as was concluded by the Czarist Government in the case of the Chinese Eastern Railway.

RAILWAY MAP OF CHINA



China Must Look Out

It seems clear that though Russia has changed her outward complexion since the

the Railway, from Kwangchengtze, or Chang Chun, to Port Arthur was surrendered to Japan. The Chinese Eastern Railway system, as it now stands, has a total length of about 1,070 miles. It is to be presumed that the section of the Railway transferred to Japan shall revert to China at the time the entire Railway is to be redeemed, upon payment to Japan of any investments she has expended in this branch of the railway. Under no circumstance, however, should China be called upon to pay twice for the value of the line extending from Kwangchengtze to Port Arthur. If China pays the Russo-Asiatic Bank the price covering the whole system of 1,600 miles, any claims Japan has should be settled between Japan and the Russo-Asiatic Bank.

The First Basis of Valuation

There are two avenues of approach in establishing the purchase price of the Chinese Eastern Railway to be paid by the Chinese Government. The first basis is found in Section 30 of the Agreement defining the Statutes of the Chinese Eastern Railway Company which reads:

> "On the expiration of thirty-six years from the time of completion of the whole line and its opening for traffic, the Chinese Government has the right of acquiring the line, on refunding to the Company in full all the outlays made on it, and on payment for everything done for the requirements of the Railway, such payments to be made with accrued interest. It follows as a matter of course that the portion of the share capital which has been amortized by drawings and the part of the debt owing to the Russian Government under guarantee and repaid out of net profit will not constitute part of the purchase money. . . . "

This means that the purchase price will be approximately the aggregate of the share capital and the bond capital outstanding at the time of redemption, since it was provided that any sum remaining in the reserve capital account at that time becomes the property of the shareholders.

The Second Basis of Valuation

The second basis is found in a documentary letter addressed to the Chinese Minister by the representative of the Russo-Chinese Bank, under the date of September 2, 1896, a part of which letter reads as follows:

> ". . . The accounts of the Railway to be constructed will be made up annually and will be published officially. This report will present the status of the several accounts, the receipts and expenses for operation and also the service of debts, loans, etc. The eventual repurchase would be effected on the basis of these balances as published annually."

If records showing the status of the accounts here referred to are complete, the price at which China shall redeem the Railway can be easily determined.

Rough Estimates

It was estimated that the total cost of construction for the whole system was about Rubles 422,292,000. This would amount to about 400,000,000 silver dollars at the rate of approximately one dollar silver to one ruble. It may well be presumed that a considerable part of the amount has been amortized from time to time, so that the actual cost is at present much below 400,000,000 dollars. In the absence of concrete data on which a conclusion as to the actual cost of the Railway can be based, some rough estimate can be gotten through a comparison of the capitalized mileage value of some of the Chinese Government Railways.

The following is a comparison showing the cost per mile of line of some of the Chinese Government Railways for the year 1923:

Name	Total Mileage	Total Cost of Road and Equipments	Cost Per Mile
Peking-Hankow	825	$120,968,000	$146,600
Peking-Mukden	605	94,263,000	155,800
Tientsin-Pukow	687	118,999,000	173,200
Shanghai-Nanking	203	32,960,000	123,000
Taokow-Chinghua	110	8,351,000	75,900
Hupeh-Hunan	260	59,396,000	228,400
Peking-Suiyuan	550	56,174,000	102,100
All Government Railways ...	4,267	629,074,000	147,400

From the table it is seen that the Hupeh-Hunan line has the highest capitalized value per mile of line, amounting to $228,400; the Taokow-Chinghua Railway has the lowest value, amounting to $75,900, and the average for all the government railways, $147,400.

By reason of its location and the character of its traffic, the Peking-Mukden Railway would perhaps come nearer the true value of the Chinese Eastern Railway. On the basis of the capitalized value of $155,800 per mile of the Peking-Mukden line, the entire system of the Chinese Eastern Railway of 1600 miles would have a capitalized value of $249,280,000 which, I believe, is not far from the truth. On the basis of the lowest capitalized value of $75,900 per mile of the Taokow-Chinhua line, the whole Chinese Eastern Railway would have a capitalized value of $121,440,000, which may be below the actual cost. On the basis of the Hupeh-Hunan line of $228,400 per mile, the total capitalized value would be $365,440,000. This last figure would of course represent the maximum valuation, and I believe it is much too high.

Financial Preparations Necessary

Although a definite figure cannot be established at present which would represent the total cost of the Railway to be paid by the Chinese Government in the time of redemption, it may well be presumed that the purchase would involve hundreds of millions of dollars. It is a great financial transaction. In order to insure its success, China must be prepared.

Government Finance Seems Hopeless at Present

Just now China is in such financial muddle that many simply cannot conceive how she can extract herself from the deep mire. Indeed, since the beginning of the Republic, China has been continuously sailing in precarious financial straits. Government expenditures exceed its actual revenues. Demands for funds from the different departments of the Government become more urgent day by day. She lives practically from hand to mouth. In all appearance, her financial situation is hopeless.

Real Situation Not So Bad

When the problem is analyzed, however, the situation is not so had as it appears. As a matter of fact, the Chinese Government finance is an extremely easy problem. A complete financial rehabilitation could be accomplished, if an opportunity is given to men of broad financial knowledge and ability to work out the problem, with the support of the entire nation.

The immense country with a population of 400,000,000 and the vast natural resources has the least financial burdens in the world, as far as the national debt is concerned. At the present, the public debt of China, both domestic and foreign (exclusive of railway debts) does not exceed 2,000,000,000 dollars. This gives a per capita ratio of approximately $5, which is insignificant when compared with the per capita ratio of $1,400 in Great Britain; $1,300 in France; $400 in the United States (Federal only); $300 in Belgium; $190 in Italy, and $50 in Japan.

Need of Restoring National Credit

Nevertheless, it has to be adimtted that China is experiencing some financial difficulties at present, and her national credit has been in the decline. As a first step to financial reconstruction of China, I suggest the complete restoration of the national credit, which is a pre-requisite to making any successfull financial arrangements for redeeming the Chinese Eastern Railway, and, in fact, to making any constructive programs that call for financial involvement on a large scale.

Settlement of Unsecured Indebtedness

At present there are outstanding unsecured domestic and foreign loans and various advances to the Chinese Government

amounting to, including interest, approximately $600,000,000. A large portion of these loans has been defaulted in their interest payments and in many instances their principals are overdue. As long as these obligations are not met, the national credit of China will remain below par. It is then of paramount importance that these unsecured loans be properly settled first, either by making payments promptly when due or by refunding them into a secured issue.

In a statement delivered by members of the Financial Reorganization Conference, of which Mr. Liang Shih-yi is the chairman, five major points were set forth for special consideration in connection with their work. They are: (1) a clear demarkation regarding the power of the Central Government and that of the provinces, with the view to drawing a dividing line between the revenue of the Central Government and that of the provinces; (2) the budgetary control of the finances of the Central Government and the provinces; (3) improving the economic conditions of the people through reforms such as the abolition of the likin and the revision of tariff rates; (4) settlement of the present unsecured debts; (5) reform of the present military system with a view to cutting down the enormous military expenses amounting to 50 per cent. of the nation's revenues. I believe these points afford a sound working basis on which a financial rehabilitation can be achieved.

Where the Tariff Conference Comes in

The present Peking Tariff Conference to provide for an increase of tariff rates from 5 per cent. to 7½ per cent. and more and to consider the question of tariff autonomy comes into the picture at this most opportune moment of financial reconstruction. When the increase is effected, a 2½ per cent. increase alone would, based on the 1924 figure of $105,000,000 net customs revenues (70,000,000 Haikwan Taels at $1.50) bring in an additional revenue of $35,000,000. The sum of these amounts, *i.e.* $140,000,000 plus the yearly increase of revenues due to natural growth of trade averaging $3,000,000 would raise the total revenues for 1926 to approximately $143,000,000. After deducting loan services of $90,500,000 in 1926 secured by the customs revenues, there would leave a surplus of $52,500 ,000. The amount of the annual surplus revenues will increase from year to year as the customs revenues grow simultaneously as a result of annual growth of trade and the gradual reduction of loan services charges against the customs revenues. This revenue surplus would afford an ideal basis for a new issue of bonds to the extent of $700,000,000 for refunding the unsecured loans. It seems to me that to nowhere else can the increased tariff revenues be better applied than to the use above referred to, as a preliminary step to restoring the national credit. When the tariff autonomy shall have been restored to China, revenues from this source will increase many-fold and additional loans many be floated to secure funds for other useful and constructive purposes.

The Redemption Machinery

When the way for financing this important transaction, namely, the redemption of the Railway, is paved through the restoration of national credit, what needs to be done next is to set up a proper machinery to handle the work connecting therewith. Such machinery may take the form of a specially appointed and duly authorized commission, with sub-commissions under it. The commission should include men of financial, engineering and legal knowledge to look after the various phases of the transaction, either jointly or separately. Probably, it would be advisable to include one having experience in the publicity field to assume the work of informing the public as well as creating sentiments in this important project. The commissions with the aid of technical experts whom it may see fit to employ should be charged with the whole responsibility of getting back the Railway.

Two Main Tasks of the Commission

There are two main tasks the commission must assume. They are, first, the proper valuation of the Railway and, second, the financing of the purchase. With reference to the first problem, much has been said in the earlier sections of this paper. However, if it is necessary to establish some arbitrary figure for the purchase price of the Railway to be paid by China, that figure should be arrived at scientifically.

There are two general methods by which the value of a railway can be approximated, namely, the physical valuation and the commercial valuation. Commercial valuation is obtained by applying the market value of securities which they possess to the volume of securities outstanding. In brief, it means an investigation based upon market prices of the railway securities. Physical valuation, on the other hand, involves four schemes or processes: (1) original or actual cost of construction; (2) reproduction cost, new; (3) present value—replacement cost less depreciation; (4) market value based upon earning power. It is not necessary here to enter into a discussion of the merits and limitations of the two general methods or of the different schemes under which physical valuation may be based. Should occasion demand a valuation on the basis of one of these methods or processes, that based upon the market value obtained by capitalizing the earnings of the Railway would be the most equitable in this case. In this connection, it should be remembered that the book value covering the cost of properties seldom represents anything even approximating the facts. It may well be presumed that the book value, in the case of the Chinese Eastern Railway Company, had been exaggerated far beyond the truth.

Considerations of a Financial Plan

With respect to the second point, namely, the formulation of a financial plan whereby funds are to be secured to pay the purchase price, the work involves a number of considerations. Foremost of the considerations are: (1) the financial plan, in whichever form it may assume, must inspire the highest degree of confidence among the investors and incorporate all possible safeguards for the investment public; (2) the plan must be workable. Any successful financial plan must embody these two fundamental principles. One without the other results in failure; they are the irreducible elements in the formulation of a successful financial plan.

The Human Factor

Before presenting definite financial plans, I beg to indulge a few words on the importance of human factor in connection with redeeming the Railway. I believe in a colossal undertaking such as this, public sentiments are highly essential. The public not only should be thoroughly informed, but also should be perfectly convinced of the importance of the issue. More than this, every citizen of China should be made to feel that he owes a duty toward his country. He should be led voluntarily to subscribe to the cause with all he has. In brief, this colossal work must enlist the support of everyone and all.

I have strong reason to believe that the Chinese people are red-blooded. I believe they are patriotic. There will be thousands. nay, hundreds of thousands who will want to contribute most generously to the cause. There will be as many making heavy sacrifices for the consummation of this work. But just because of the great confidence on the part of the people, there is the imperative necessity of providing all the possible assurance of success in the financial plan to meet their aspirations. This means that the principals of their investments must be safeguarded and that a fair return be guaranteed to them. I strongly urge that the whole work be administered with one hundred per cent. honesty.

The Financial Plan

The financial plan which I would suggest for the purchase of the Chinese Eastern Railway will consist of two parts: (1) the pre-redemption financial preparations involving the issuance of securities in anticipation of the purchase; (2) post-redemption financial adjustments involving matters such as the rebonding of the Railway and securing of funds to make necessary changes and improvements to place the Railway on an efficient basis.

I deem the first part of the plan necessary, because it fills several distinct needs. In the first place, I believe that a task of this magnitude and importance calls for adequate financial preparations well in advance. It is unfortunate that the Chinese, like many

others, are often known as those who resort to embracing Buddha's feet in the face of calamities. This lack of preparedness is generally due to their failure to appreciate the importance of issues they must face. In the second place, I believe that any plan, when once set into motion, will help over come the inertia that always blocks the way of a great movement, and that may otherwise prove ruinous if it has not been properly reckoned with. Finally, I believe that action brings before the eyes of the public the reality of the issue, which is of great psychological importance.

The Pre-redemption Financial Plan

My suggestion favors the issuance of the Chinese Eastern Railway purchase money bonds by the Chinese Government, to embody the following points :

1. The total authorized issue shall be $400,000,000 to be divided into four series of $100,000,000 each. As loans authorized hereunder are floated, the first issue shall be known as " The Chinese Government Chinese Eastern Railway Purchase Money Loan, Series No. 1 " ; the second issue, as " The Chinese Government Chinese Eastern Railway Purchase Money Loan, Series No. 2," etc.

The total authorized issue may be put out at once, or at different times in one or more series. In case any one or all of the series shall be issued in a foreign market or foreign markets and in foreign money, the amount so issued shall be equivalent to the exchange value of the authorized amount in silver dollars.

The terms of issue, such as the rate of interest, the time of payment, the time of maturity, etc., shall be determined later in accordance with market conditions and other considerations.

2. The proceeds of the loans shall be used (1) for defraying expenses incurred in connection with the purchase, (2) for the payment of the purchase price of the Railway, (3) for proper investment in the Railway after the purchase, should there be any surplus left over after the proceeds have been applied to items (1) and (2). Under no circumstances shall any portion of the proceeds be diverted to other channels than mentioned above.

3. Payments for bonds may be made in bonds of the Chinese Eastern Railway issued either by the Chinese Eastern Railway Company or by the Russo-Asiatic Bank on account of the Railway. Such payments shall be based upon exchange ratios to be determined later.

4. Bonds issued hereunder shall be convertible into a later issue or issues of the Chinese Eastern Railway after the purchase by the Chinese Government. Bonds not converted prior to a certain fixed date shall be subject to call, in part or in full, at a price to be determined later.

5. The bonds shall be direct obligations of the Chinese Government, if necessary, to be specifically secured by definite assets or revenues.

6. Bonds of denominations of both small amounts and large amounts shall be issued to facilitate the purchase by all classes of investors. When the issue is put out in China, bonds of denominations of $5, $10, $50, $100, $500, and $1000 may be issued to advantage.

The Post-redemption Financial Plan

The post-redemption financial plan involves a refunding mortagage issue, or issues, for a similar or greater amount, the purposes of which shall be :

1. To refund the Chinese Government Chinese Eastern Railway Purchase Money bonds ;

2. To make necessary impovements to put the Railway on an efficient basis, both in physical properties and in the organization and management of the Railway ;

3. To pay for the change in the gauge of the Railway which is now in the Russian gauge.

I deem it highly advisable to refund the purchase money issue for the reason that by bonding the Railway upon a mortgage of its physical properties, not only the Chinese Government can be released of this tremendous financial obligation, which the Railway should rightly assume, but the finances of the Railway can be greatly simplified by concentrating all funded indebtedness on one or more issues.

In the original agreement between China and Russia relating to the construction and operation of the Railway, it was specially provided that the gauge of the line should be same as that of the Russian railways (5 Russian feet or about four feet, two and one-half inches, Chinese). For both political and commercial reasons, this gauge should be changed to the Chinese railway standard gauge, which is four feet, eight and one-half inches.

The principal of the loan shall be secured by a first mortgage on the Railway, and interest, by its earnings. If occasion demands, the Chinese Government should guarantee both the principal and interest of the loan, with certain specified assets or revenues.

Minor details relating to the rate of interest, the time of payment, the date of maturity, the denominations, etc., are to be determined afterwards in the light of market conditions and the temper of the investment public. It should be emphasized, however, that every possible means should be provided for the protection of the investors and for the nation-wide participation in the issue.

Conclusion—The Importance of Issue Re-emphasized

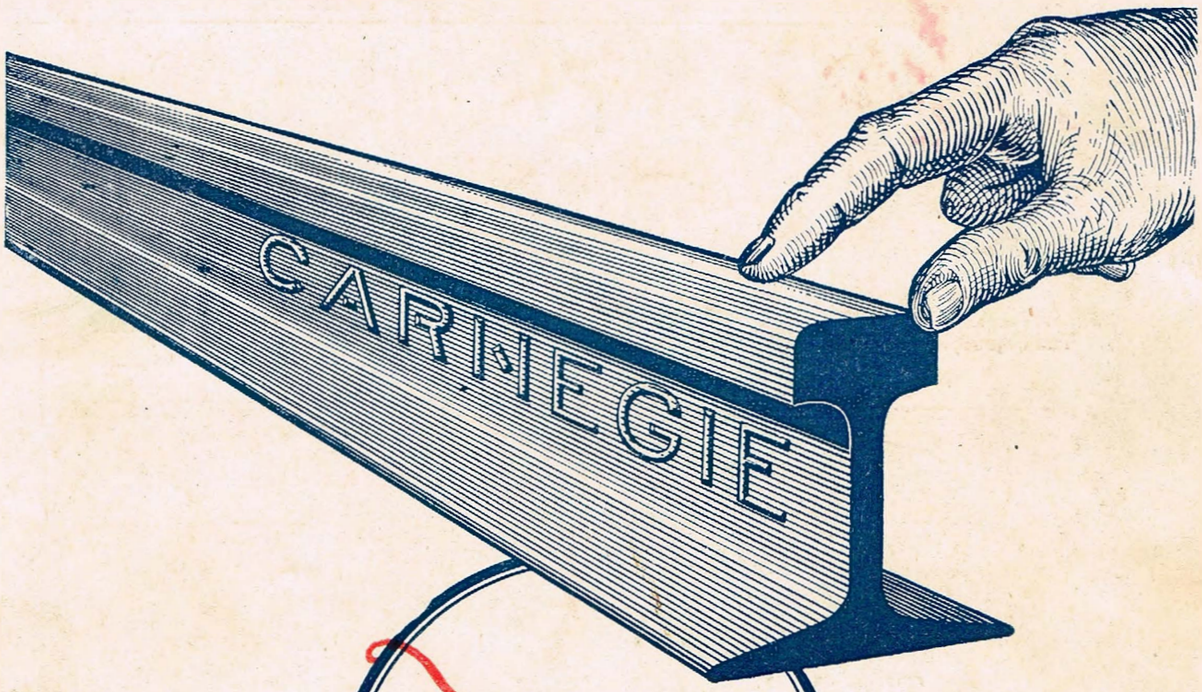
In conclusion, I wish once more to emphasize the extreme importance of the issue. I have shown that the Chinese Eastern Railway holds the keynote to the vital problem of peace or war in the Far East in the future as well as in the past. I have indicated the political aspects of the Railway and its relationship to the interest of China, Japan and Russia. Finally, I have related the vast social and economic significance attached to the Railway.

For all these, China must restore this Railway. She should do so even if she has to make great sacrifices.

Recently, there have been various indications of Russia's activities aiming at the control of the Railway beyond the redemption period. One of her baits offered to China for relinquishing the option of purchase is found in Article 1, Section 13, of the Mukden Agreement, September 20, 1924, between Manchuria and the Soviet providing that the concession period of eighty years mentioned in Article 12 of the Contract of September 8, 1896, for the construction of the Chinese Eastern Railway, shall be reduced to 60 years upon the expiration of which the line with all its appurtenances will pass free of charge to the Chinese Government. She further offered to reduce the afore-mentioned period of 60 years, this question to be taken up for consideration with the approval of the two Contracting Parties. I deem it my duty to point out the folly of China in even fancying on an inducement of this sort. It would not only accrue no benefit to China, but may cause the Railway to be lost to her when the Red bear becomes too strong and fierce to submit to reasons. According to certain railway experts well informed in the condition of the Railway, it can be made to pay the price of the entire in a period of five years. Therefore, what benefit can China get even if the concession of the Railway were reduced to 50 years, instead of 60 years ?

Success Depends upon World Confidence

The success of this stupendous work much depends upon the confidence the world has in the Chinese Government. The whole nation would stand solidly behind the Government if they believe the central authorities to be sincere to their purposes and honest in their administration. I think that in no other period is the virtue of sincere and honest government more needed than the present when the nation is undergoing political and financial reforms. The world would be sympathetic toward China and generous in their support if they believe that the Chinese Government is capable of carriyng responsibilities and obligations it must assume. While China has every reason to work for the restitution of her alienated rights granted under duress or otherwise and to make reforms of any sort, I favor that China follows a procedure that is in accord with the best practices of international relations, a procedure that is evolutional and reasonable, not revolutionary and violent. I believe that the time is over when self-interests and intrigues alone dominated the international dealings. They are slowly, but surely, being supplanted by altruism and mutual helpfulness. And the nations of the world are more and more looked upon as members of a big family. I believe that the rest of the world will do their part if China will live up to her obligations. The spirit which permeates the Peking Tariff Conference, which has accepted the principle of China's tariff autonomy effective in 1929, bears a direct proof of my observation.



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THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

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遠東時報

THAT "GREAT PACIFIC WAR"

By George Bronson Rea

IS THE BRITISH BOXER INDEMNITY TO BE WASTED?

THAT INHUMAN IMMIGRATION LAW

CHINA A GROWING MARKET FOR IRON AND STEEL

ELECTRICAL DEVELOPMENT IN JAPAN

CHINESE TURKESTAN AND CENTRAL ASIA

DESIGN OF A REINFORCED CONCRETE FLOATING DOCK FOR UPPER YANGTZE RIVER p. 118

NEW TOHO PLANT AT NAGOYA

THE N.D.L. PASSENGER LINER "FULDA"

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A. L. TAYLER.

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The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XXII SHANGHAI, MARCH, 1926 No. 3

That "Great Pacific War"

"The Wrath to Come"

By Geo. Bronson Rea

America and Japan have settled their differences and are now working harmoniously for the solution of Pacific problems. American capital has flowed into Japan and a new spirit of cooperation and mutual confidence has displaced former distrust, All legitimate causes for war have disappeared. A pretext for hostilities must now be based on the assumption of bad faith on the part of either government, a slander which can safely circulate only in the pages of fiction. Mr. Hector C. Bywater in "The Great Pacific War, 1931-1933" and Mr. E. Philipps Oppenheim in "The Wrath to Come" have resorted to this method in order to hold Japan up to world scorn as a nation that cannot be trusted to keep her solemn agreements. Both writers are British subjects. The highest official spokesmen for the British Government have repeatedly declared that Japan carried out faithfully every provision of the Anglo-Japanese Alliance and cheerfully contributed her share towards winning the war for the Allies. Why do British writers at this late date insist that Japan cannot be trusted? Why do they insist on predicting war between Japan and America arising out of some act of bad-faith on the part of Japan, when they admit that neither side has anything to gain? What is behind this new trend of anti-Japanese agitation leading up to war in the Pacific? What part will Great Britain play in such a war, if it ever comes? What is the real significance of Singapore?

IN the September number of THE FAR EASTERN REVIEW, we reviewed the latest fiction from the pen of Mr. Hector C. Bywater, whose expert knowledge of naval affairs and gift of inventing international conspiracies against the peace of the Pacific has won for him the distinction of being one of the foremost naval strategists of Europe.

Mr. Hector C. Bywater is a British subject. For over twenty years the nation to which he owes allegiance was the honored ally of Japan. The partnership was entered into at a time when Russia was over-running Asia, seeking from every angle a feasible road over which to hurl her armies into the coveted plains of India. Russia's secret alliance with China in 1896, the building of the Chinese Eastern Railway, the creation of a deep-water port at Dalny, the concurrent and sinister moves of her French ally in South China together with the activities of her Belgian financial agents, had for their ultimate goal the opening of a road through China over which the Russian hordes could penetrate India from the northeast, protected by fleets based at Dalny, Kiaochau, Kwangchowwan and the ports of Indo-China. At no time in her long history, not even during the recent Great War, was Great Britain called upon to face such a formidable coalition and concerted movement to eliminate her as an Asiatic power. In those days Great Britain stood in splendid isolation, with every European power working for her humiliation.

Russia's Sinister Motive

Russia's activities in Korea and Manchuria while sufficiently menacing and provocative for Japan, were only minor moves in the greater game for the conquest of India. With all the white powers of Europe intriguing for her downfall, Great Britain swallowed her pride, cast aside her racial prejudices and accepted an Asiatic nation as an ally and full partner in the game which was being played on the political checkerboard of Asia. Placed in a similar perilous position and pitted alone against Russia, Japan might have gone under in the conflict and night have been annexed to the rapidly expanding Muscovite system. The Anglo-Japanese pact was therefore vitally and mutually beneficial to both parties, but because of her exposed position, it threw upon Japan the burden of a conflict, which in preserving her own independence and rescuing China from the yoke of Russia, consolidated the British hold on India. Japan fought and won Great Britain's war and in doing so sacrified over 200,000 men, burdened her people with an enormous debt and then faced a still more determined war of revenge which imposed greater military burdens and hardships on her overtaxed people. No matter what political mistakes Japan may have committed in after years, which seemed to conflict with minor British interests in China, it ill becomes any fair-minded Briton to be her critic. The ledger balance is too great on the other side.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

SUNYATSENISM

RUSSIA'S DEFEAT IN CHINA

DESTRUCTION OF CHINA'S RAILWAYS

NO CHALLENGE FROM ASIA

DEVELOPMENT OF TRANSPORTATION IN JAPAN

MITSUBISHI ENTERPRISES IN THE FAR EAST

ELECTRICAL EXHIBITION AT OSAKA

FUSI ELECTRIC MANUFACTURING CO.

Vol. XXII April, 1926 No. 4

SHANGHAI, PEKING, TOKYO AND MANILA

上海仁記路拾六號

遠東時報

The Destruction of China's Railways

FOR two years the railways of China have been used by militarists as their private property, for the purpose of moving their troops from one part of the country to the other. Railway cars have been turned into barracks and locomotives have been held privately almost as one stables a horse in his private mews. There has been no through traffic on the Tientsin-Pukow line since September, 1924, although sections of the railway have been permitted to function by local militarists as part of their divine right to do as they please. The Lung-Hai railway has also been closed from time to time, and its re-opening is announced as we go to press. The Kin-Han railway between Peking and Hankow, opens and closes at the will of the soldiers and without the slightest regard to the needs of the people, or the condition of the lines. The Peking-Mukden line either closes as a whole or is divided into two parts with two separate administrations, as the exigencies of Peking politics permit. The Canton-Kowloon railway is operated in two parts, one from Canton and the other from Hongkong although the up-keep on both sections is superior to anything in north China.

The description of the above railways holds good throughout China. Funds are sequestered by the militarists, so that the Ministry of Communications, which used to be the richest of all ministries has now degenerated into a poor organization without any control over the agencies which compose it. The money is held by the militarists through whose territory the line passes. There was a strange situation on the Kin-Han line at one time when three different militarists held sections of the road and seized its revenue. None of the indebtedness to foreign firms are being met, and as most of these debts are for goods actually delivered, the credit of the railways is entirely destroyed, and the various administrations are unable to purchase the supplies and replacement parts for the maintenance and up-keep of the lines, with the result that they have degenerated to such an extent that it is correct to state that some of the lines are not in a position to continue efficient operation without complete reorganization and a replacement of locomotives, passenger and goods cars. It is reported that one railway has only four locomotives left in any condition for operations and that all the water tanks along the line of another, have burst. It is known that the soldiers have used the woodwork on some of the cars for fire-woodduring the winter and that some of the usable locomotives can only operate after the whole of the station has been filled with the steam from their leaking pipes.

No matter how careless and inefficient the militarists have been in the past, they are faced now with the necessity of saving the railways from complete disappearance. Funds will have to be found for the purchase of locomotives, cars, goods cars, equipment, and even trackage, and there can be little question but that the moment the fighting actually ceases, the government in Peking will take steps to meet the situation. The disintegration of the railways in North China is now so complete that if the government does not take some steps to restore them to a degree of efficiency, the lines will become nothing but road-beds with rusting tracks from place to place. The Chinese are too practical a people to allow such a condition to obtain indefinitely, and it is therefore to be assumed that we are on the verge of considerable activity in railway building and railway developments in China.

It may be suggested that no one will be willing to do business with the Chinese Government Railways because of their unfavorable record in connection with their meeting of financial and commercial obligations. Business firms will naturally be chary about making further advances to the Chinese Government Railways in view of their inability to meet their obligations in the past. On the other hand, if the Chinese Government undertakes to develop the railways, funds can be made available for this purpose. For as soon as the fighting in the present war ceases and any government in Peking is given a breathing spell for responsible diplomatic activity, the Customs Conference will reach a conclusion and at least Taels 100,000 will become available to the government, part of which can be used for the restoration of traffic. At the same time a part of the British Boxer indemnity will have to be invested in some form of security which will be satisfactory to both Great Britain and China, and strong pressure is now being brought to bear on the Commission to use these funds for railway development. Marshall Wu Pei-fu, who has now returned to power, was the first Chinese official to suggest using the Boxer Indemnity Funds in connection with the railways and there is no indication that he has changed his mind. Altogether the misuse of Chinese railways presents a tragical picture of economic wastefulness, business men interested in selling railway materials must regard this market as opening up and as beginning again to become important. For China, will not return to a condition where there are no railways in the country. When the Chinese people realize the actual situation, when it presents itself to them in all its horrors, they will arouse themselves as they can and they will create credits. That perhaps is the outstanding characteristic of the Chinese, they do nothing for years and years and then suddenly they change their tactics and find what they call, "a way out."

There will be considerable competition in the China market, as every country producing railway materials will enter into the struggle for successful sales. Success will depend upon price, but to a greater extent upon business methods and financial ability. The Chinese will depend to a larger degree upon their own engineers than upon foreign advisors as heretofore, and those trade names which are best known in China will have an advantage over those not so well known. This is the time for firms interested in this business to watch the market and to take steps to protect their future interests.

Japanese Trade and China

MR Kenji Kodama, President of the Yokohama Specie Bank, Ltd., in his annual address, makes a brilliant survey of the economic and political situation in China during 1925. He particularly points to the fact that although the year has been one of continued disturbances, business has not suffered as much as might have been expected. Mr. Kodama's statement follows :

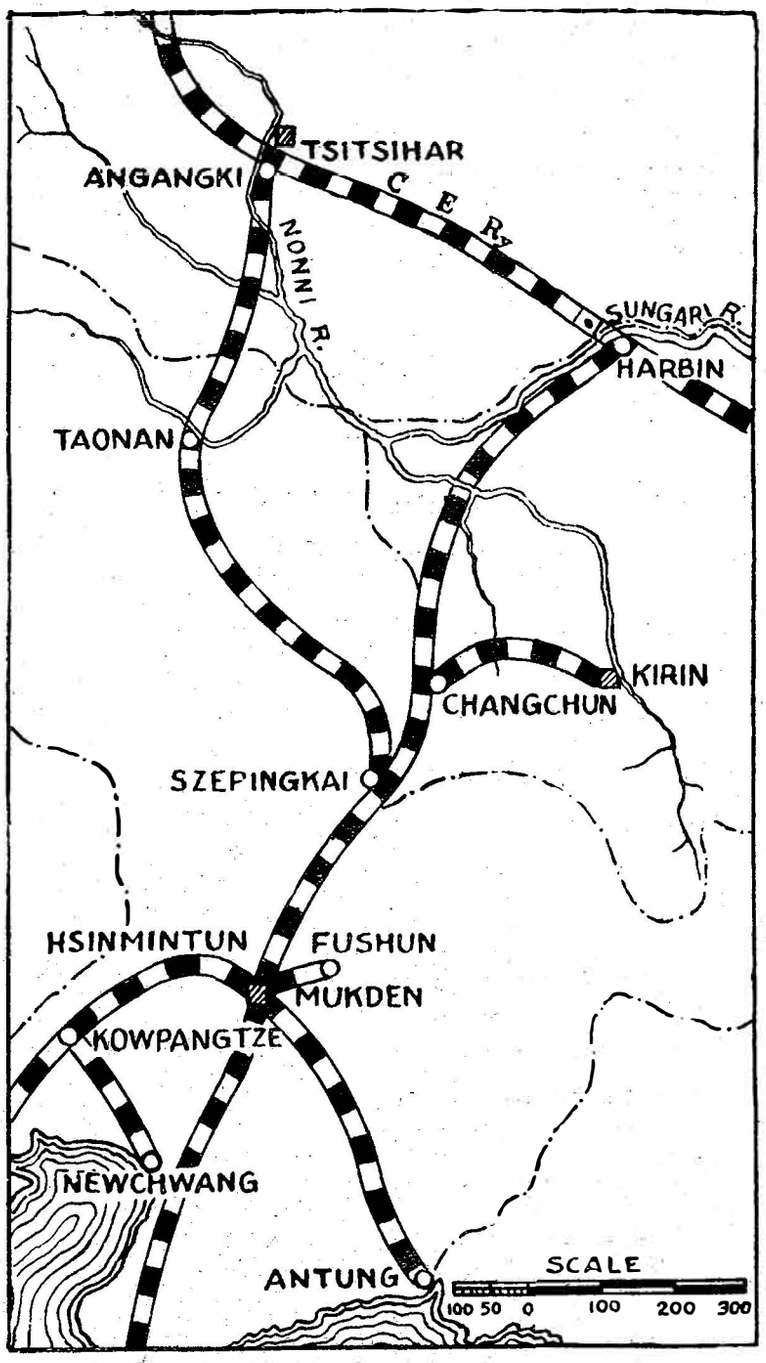
Turning to China, the anti-foreign feeling and the movement for the restoration of national prestige, both of which characterized the close of the previous half-year and were the consequence of the riot in Shanghai on the 30th May last, were still in evidence and were getting even stronger during the early part of the period. The strike of Chinese workmen and students at Shanghai continued until September ; Canton's boycott of Hongkong remained as strong as ever ; a third war broke out between Fengtien and Chihli towards the end of October, to be immeiately followed by another between Fengtien and the Nationalists, and as the result of these troubles, spread over the country, communications in the interior were often thrown into disorder and the transportation of goods greatly hampered. Under the circumstances, trade should have suffered a great deal, but strange as it may seem, there is evidence to the contrary in the statement of Customs revenue for the year, which shows that, except for a slight increase, there was no particular difference in receipts as compared with the previous year, such revenue as was lost in North China having, apparently, been more than compensated for by an increase in the North. It is, therefore, clear that China's foreign trade has not suffered at all, despite the constant trouble in different parts,

The Taonan-Tsitsihar Railway

ACCORDING to a statement issued by Yu Chang-fu of the Taonan-Tsitsihar Railway, the construction of this line, which is an extension of the railway running from Szepingkai, on the South Manchuria railway, was resumed after the ice melted on the Nonni river. Advantage of the ice was taken to build the foundation of the bridge which has to be thrown over the river. This will measure 2,630-ft., and is expected to be completed in June, allowing for trains to run between the two termini by July. In order that track-laying may be pushed forward rapidly, two machines of American make are being employed. Each of these has a building capacity of three kilometres a day, so that Angangchi, 36 kilometres distant from the river, and the junction of the Chinese Eastern Railway, will be reached without difficulty within a fortnight.

Here the most difficult feature of the enterprise will present itself. The area of land attached to the C. E. R. at and about the Angangchi station is very extensive, and the engineers are now engaged in trying to select a place somewhere outside this zone for the purpose of erecting a viaduct to cross the Chinese Eastern, and eventually to join up with the light railway to Tsitsihar, capital of Heilungkiang province. It is understood that negotiations are in progress to this end between the two railway authorities. After these negotiations are satisfactorily completed, it is planned to convert the light railways to standard gauge.

The entire length of the railway is 230 kilometres, of which 186 kilometres between Taonan and Nenkiang (Kiangchiao) were built last year. Stations, offices, and quarters for employees have still to be constructed, but "the entire work will be finished and the traffic started by the end of the year, unless something unforeseen turns up," according to Mr. Yu, quoted by the *Manchuria Daily News*. "The Chinese Eastern Railway," Mr. Yu, adds, "has not yet given any facilities for the transportation of building materials, compelling the authorities to bring up material by means of carts from a long distance." Mr. Yu says "that the work was somewhat delayed on account of this circumstance."



The Taonan-Tsitsihar Railway

At present, trains are operated between Taonan and Tailai for the transportation of construction material, carrying third class passengers at the same time. This year, when the operation of trains becomes possible, business will be commenced while the work is being pushed on. Mr. Yu anticipates that passenger cars under order will be completed by August, but for the present the entire rolling stock is being borrowed from the South Manchuria Railway Co. Railway stations to be built this year are ten in number; Taonan, Taoan, Chentung, Tungping, Chiehchi, Tailai, Wumiaotzu, Nenkiang, Ifutuan and Mokutuan.

As to the economic value of the railway, the authorities are not positive whether it will prove a paying investment from the start, as the country through which it travels is not fully developed, but it will help considerably to attract traffic to, and feed, the South Manchurian Railway. The S.M.R. Co., are acting as the contractors for the Chinese authorities, the understanding being that the new line will be paid for within a certain period after its completion. An alternative stipulation, it is understood, is that a loan might he raised from the S.M.R. Co.

Another account of the project is given by Mr. Fujine, Chief of the Railway Department of the S.M.R. Co., who has recently returned from a tour of inspection of the Taonan-Angangchi Railway. He says that he himself was responsible for the surveying of the Chengchiatun-Taonan section of the Szepingkai-Taonanfu railway for 142 miles. At that time, not a house was in existence and the soil was left uncultivated, but to-day the region, he found, was remarkably well developed. No sooner had the section up to the Nonni been built than the region thereabout was brought under cultivation, and although no railway premises have been built, enormous quantities of cereals have been sent southward, some to Szepingkai and others to Dairen by the S. M. Railway. No less than 100,000 tons of agricultural products have been shipped from the territory along the railway, said Mr. Fujine. This showed how fertile was the land. At the time of the survey, Mr. Fujine remarked, the country about Taonan alone was thought to be rich, but, actually, regions further north are better adapted to agriculture.

Another 4,800 b.h.p. 2 Cycle Diesel for Shanghai

The French Tramway Co. here has just again ordered an additional Diesel Engine, this time of net 4,800 b.h.p. (gross 5,250 b.h.p.).

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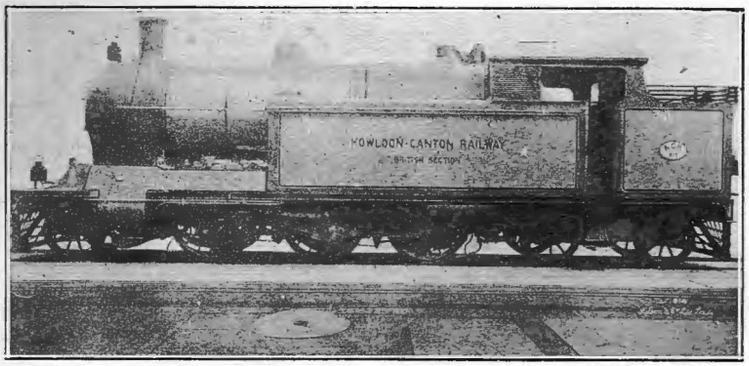
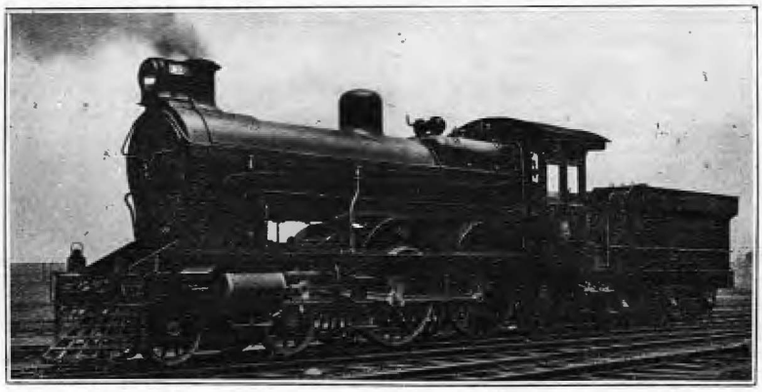
2 Sulzer 2-cycle Diesel Engines each of 1,500 b.h.p.=	3,000 b.h.p.
2 Sulzer 2-cycle Diesel Engines each of 3,600 b.h.p.=	7,200 b.h.p.
1 Sulzer 2-cycle Diesel Engine of	4,800 b.h.p.
Total	15,000 b.h.p.

This will be by far the largest stationary Diesel Engine Plant in the world.



2-6-4 Tank built by Messrs. Kitson & Co., Ltd. on the Kowloon-Canton Railway



4-4-2 Type manufactured by the North British Locomotive Co., Ltd.

Locomotives on Chinese Government Railways

THE number of locomotives on the Chinese Government railways has increased from 992 in 1922 to 1,121 in 1923. Of this increase, amounting to 129 106 came from the Kiao-Tsi (Kiaochow-Tsinan) By classes, the increase was as follows :—

	Total Increase	From Kiao-Tsi Line	Other lines
Passenger locomotives ..	23	19	4
Goods ,, ...	85	65	20
Shunting ,, ...	21	22	1 (decrease)
All	129	106	23

The fluctuations on lines, excluding the Kiao Tsi, were as follows :—

	Increase	*Decrease*	*Net Increase*
Passenger Locomotives :			
Shanghai-Hangchow-Ningpo	6	—	—
Changchow-Amoy (1) ..	—	2	4
Goods Locomotives :			
Peking-Hankow	6	—	—
Peking-Mukden	8	—	—
Peking-Suiyuan	3	—	—
Kirin-Changchun	2	—	—
Ssu-Tao Ssupingkai-Taonanfu	2	1	20
Shunting Locomotives :	—	—	—
Cheng-Tai Chengting-Taiyuanfu	—	1	24
Net Increase	—	—	—

(1) Not reported.

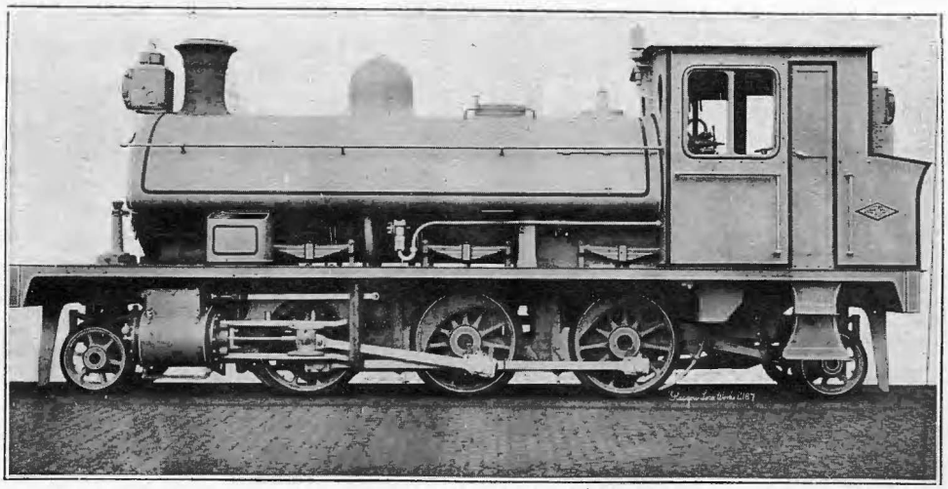
The average number of locomotives per 100 kilometres of line increased from 15.00 to 15.04 (1), caused principally by the inclusion of the Kiao-Tsi line with its large supply of locomotives.

The average age of locomotives increased by one year, from 10 to 11. It may be noted that in Goods service the age of Kiao-Tsi locomotives is only 4 years. This has been caused by the assignment of the newly purchased engines to Goods service exclusively. To Shunting service, the oldest engines on the line are now devoted.

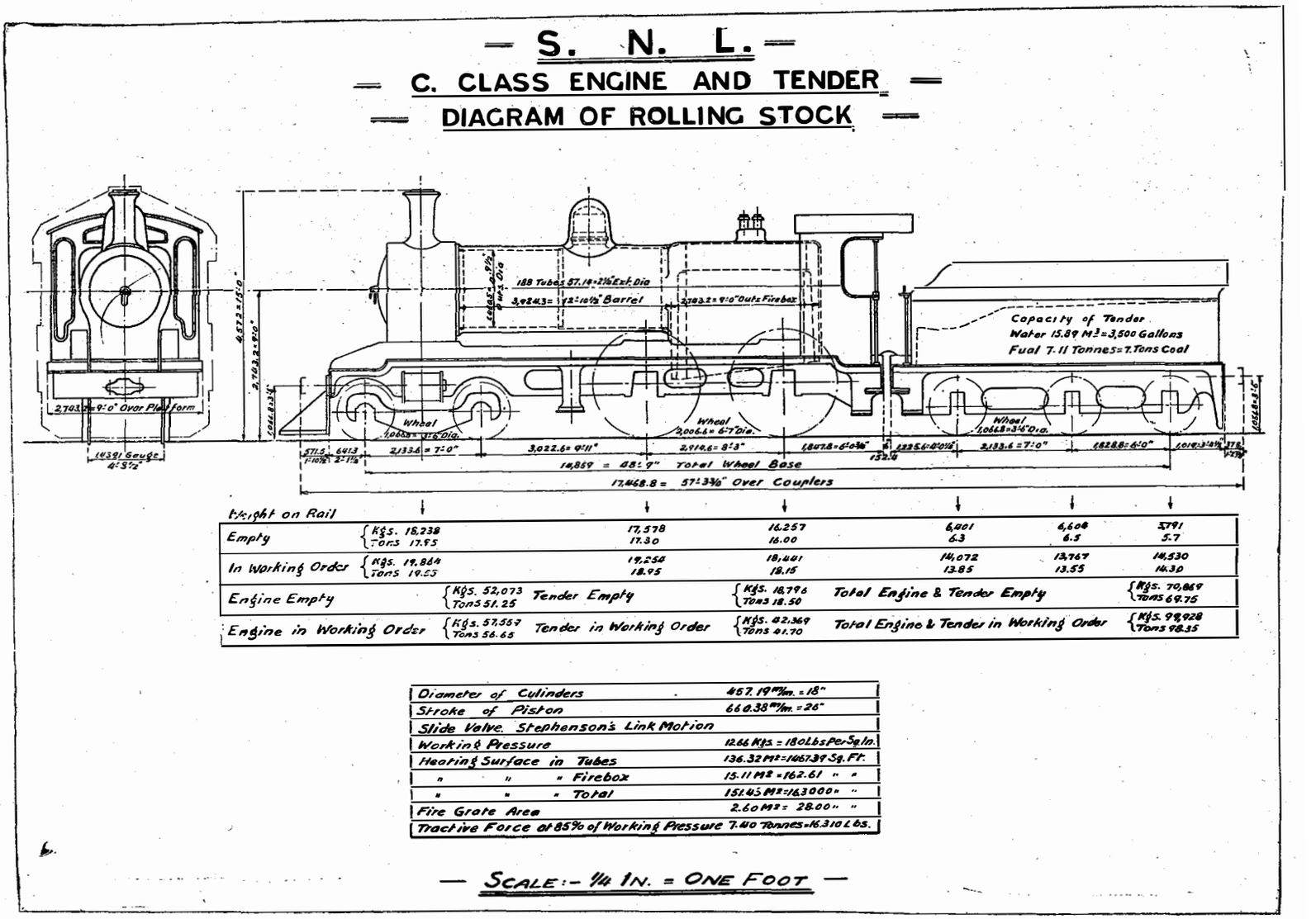
Tractive Capacity is an engineering unit. In simple terms it means the power to start a train. The additional engines purchased and brought to the total by the Kiao-Tsi line have added 1,255,733 metric tons to the total reported in 1922. The engines on the Kiao-Tsi line, however, are slightly below those of the principal lines in tractive capacity (necessitated by light rail section) and the result is that the average tractive capacity per locomotive for the Government system is slightly below that in 1922.

Per 100 kilometres of line, the average tractive capacity has increased by 3 tons, or about 2 per cent. The very adequate supply on the Kiao-Tsi line is principally responsible for this increase. This average is not final in itself as to the adequacy of locomotive supply. But, if applied to the number of service units, ton kilometre and passenger kilometres to be hauled, comparisons useful to the management can be constructed. Allowance must be made, however, for the effects of grades, curves, the condition of repair and other service conditions which are to be encountered.

For the purpose of measuring the relative work which each line gets out of its locomotives per unit, the number of locomotive kilometres may be divided by the number of locomotives, giving an average number of kilometres run per locomotive. Such an average is worked out in the following summary, which lists the several lines in order of highest performance. For purposes of this average, Shunting locomotives have been excluded. Locomotive kilometrage has been taken from Table XVI, and excludes kilometrage under "Shunting and Standing in Steam." This has been excluded along with Shunting locomotives because at best it is an arbitrary figure. Besides, the circumstances surrounding performances are so different from those attaching to road locomotive performance, that the inclusion of shunting locomotive data would confuse the issue.



2-6-2 Tank built by the North British Locomotive Co., Ltd., for the Peking-Mukden Line



Weight on Rail						
Empty	Kgs. 18,238 / Tons 17.95	17,578 / 17.30	16,257 / 16.00	6,401 / 6.3	6,606 / 6.5	5791 / 5.7
In Working Order	Kgs. 19,864 / Tons 19.55	19,254 / 18.95	18,441 / 18.15	14,072 / 13.85	13,767 / 13.55	14,530 / 14.30
Engine Empty	Kgs. 52,073 / Tons 51.25	Tender Empty	Kgs. 18,796 / Tons 18.50	Total Engine & Tender Empty		Kgs. 70,869 / Tons 69.75
Engine in Working Order	Kgs. 57,557 / Tons 56.65	Tender in Working Order	Kgs. 42,369 / Tons 41.70	Total Engine & Tender in Working Order		Kgs. 99,928 / Tons 98.35

Diameter of Cylinders	457.19 m/m. = 18"
Stroke of Piston	660.38 m/m. = 26"
Slide Valve. Stephenson's Link Motion	
Working Pressure	12.66 Kgs. = 180 Lbs Per Sq In.
Heating Surface in Tubes	136.32 M² = 1467.39 Sq. Ft.
" " " Firebox	15.11 M² = 162.61 " "
" " " Total	151.43 M² = 1630.00 " "
Fire Grate Area	2.60 M² = 28.00 " "
Tractive Force at 85% of Working Pressure	7.40 Tonnes = 16,310 Lbs.

— SCALE:- ¼ IN. = ONE FOOT —

Kilometres Run Per Road Locomotive

Name of Line	No. of Passenger and Goods Locomotives	Locomotive Kilometres: Total Road (2)	Per Locomotive 1923	1922	1920	1918	1918
1. Shanghai-Nanking	49	2,994,455	61,111	54,242	66,880	75,057	58,971
2. Kaifeng-Honan	10	583,286	58,329	60,572	54,818	52,315	51,975
3. Taokow-Chinghua	9	465,144	51,683	49,774	43,701	53,292	44,482
4. Shanghai-Hangchow-Ningpo	30	1,461,514	48,717	58,333	55,526	43,015	36,207
5. Peking-Mukden (3)	95	4,222,085	44,443	(4)	41,806	47,480	45,363
6. Tientsin-Pukow	118	5,218,987	44,229	39,902	45,237	51,364	43,890
7. Ssu-Tao	10	434,590	43,459	50,152	36,758	—	—
8. Kirin-Changchun	16	691,714	43,232	50,422	44,551	65,447	38,790
9. Peking-Hankow	196	8,442,856	43,976	40,294	57,080	58,741	55,825
10. Hupeh-Hunan	25	877,351	35,094	39,197	3,554	—	—
11. Lung-Hai	28	955,429	34,122	30,126	—	—	—
12. Cheng-Tai	44	1,414,987	32,159	24,110	27,605	25,612	17,556
13. Kiao-Tsi	84	2,520,437	30,005	—	—	—	—
14. Peking-Suiynan	110	3,003,859	27,308	23,683	32,470	25,164	22,834
15. Canton-Kowloon	12	303,296	25,275	41,115	36,858	36,113	49,143
Chinese Government Railways	836	33,589,990	40,179	36,381	43,474	47,512	43,148

(1) United States (1922) 17 per 100 kilometres of line.
Japan (1921) 32 " " "
India (1915) 15 " " "
(2) Excludes "Shaunting and Standing in Steam."
(3) "Inside Wall" locomotives only.
(4) Data for 1922 incorrect due to inclusion of "Outside Wall" locomotives and exclusion of portion of "Outside Wall" locomotive kilometres.

The average performance per locomotive for the whole system shows a considerable increase over 1922, but this is due largely to the inclusion of "Outside Wall" locomotives although it was impossible to include the kilometrage which such engines made. Excluding the Peking-Mukden, lines showing higher performance are seven in number compared with six which show a lower performance. On the whole, lines with the heaviest locomotive kilometrage showed increases in performance. It will be noted, however, that the Kiao-Tsi has a low average. The heavy reduction on the Canton-Kowloon is to be attributed to the effect of military interference.

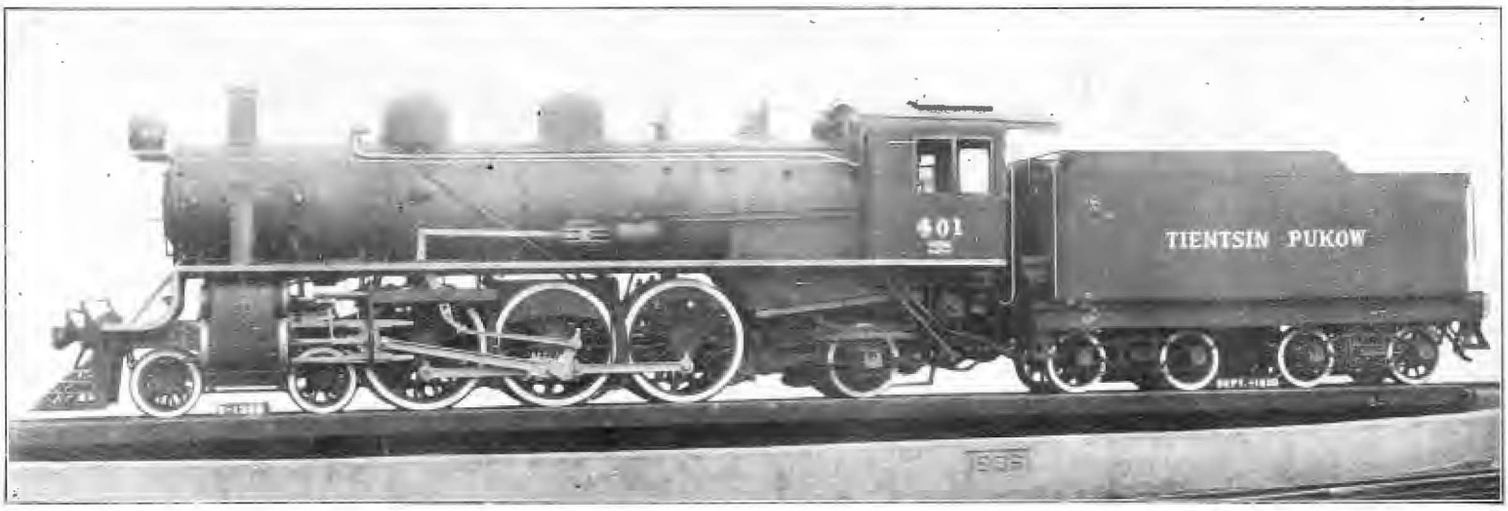
It would not be safe to assume that the average number of kilometres run is actually typical of the demands made upon equipment upon the different lines. It is quite possible that on lines showing low averages, the active locomotives are run long distances during the year, but the average is kept down by numbers of old locomotives which are held in reserve. Only a careful inspection could determine whether or not some of these old locomotives should be scrapped.

The lines at the head of this list have a performance more than double as large as those at the bottom. It may be explained that some of the smaller lines purchased locomotives at the beginning of operations in sufficient number to serve a greater length of the line whose construction then in view has not yet been accomplished. Some disparity is accounted for in part by steep grades and curvature requiring slow movement. Such occur on the Peking Suiyuan and on the Cheng-Tai lines. Some may be accounted for by the fact that on some lines Passenger kilometrage predominates while on other lines Goods kilometrage predominates. Goods trains move at lower speed than passenger trains. They are required to wait longer at stations for loading and unloading, and they usually give way to the passenger trains in the matter of waiting at passing tracks. Hence, lines with a high proportion

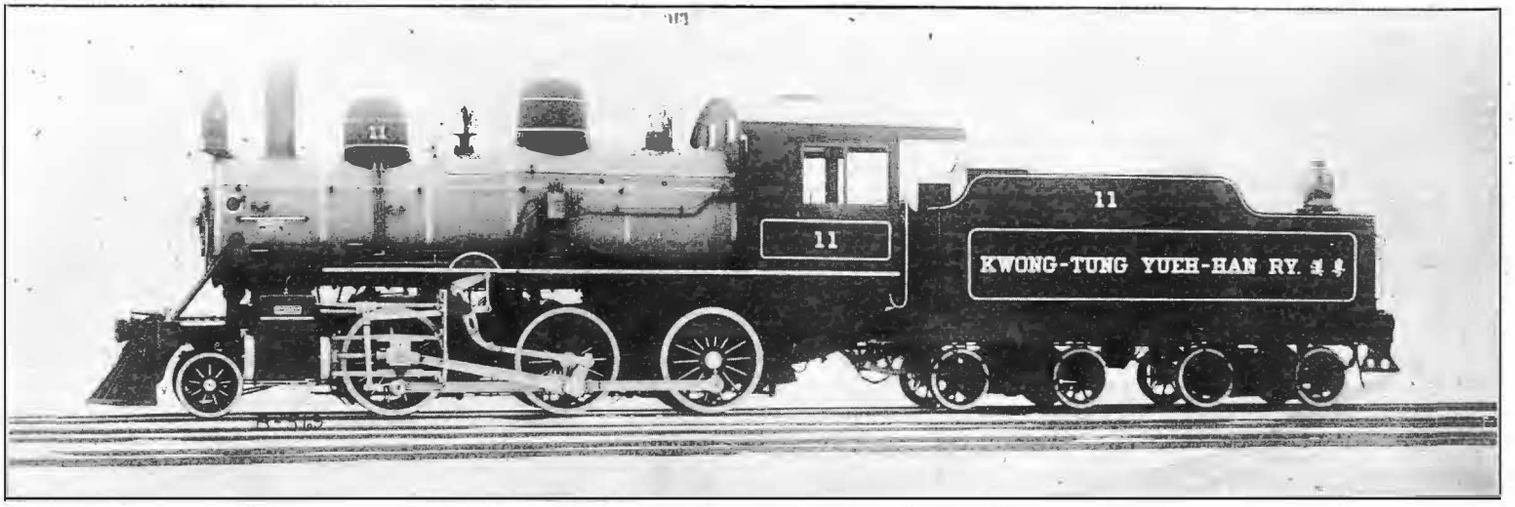
Built by the American Locomotive Company for the Shantung Railway

of passenger locomotive kilometrage should show a higher performance than others. On the Shanghai-Nanking line nearly two-thirds of the locomotive kilometrage is passenger—the Shanghai-Hangchow-Ningpo and the Kaifeng-Honan, likewise. These three lines are towards the top of the list. The Taokow-Chinghua, however, third on the list, is principally a goods carrier. The three big lines—Peking-Hankow, Peking-Mukden and Tientsin Pukow—all have a moderate excess of goods over passenger kilometrage.

The average given for the entire government system is comparable to that of other countries on a peace basis. Comparisons with other countries are not conclusive, however, due to differences in statistical practice. For example, the averages given in the foot note include Shunting data, which probably lowers the average somewhat, since Shunting time is usually converted into distance at 6 miles and 10 kilometres per hour. However, to include Shunting data in the Chinese figures would raise the average per locomotive. This again makes the comparison unfair, for Chinese Shunting figures include also "Standing in Steam" which is not recognized in the statistics of some of the other countries. (1)



Built by the American Locomotive Company for the Tientsin Pukow Railway



Built by the American Locomotive Company for the Kwong Tung Yueh Han Railway

Dissatisfaction is felt with the distribution of locomotives between Passenger and Goods types. The explanation i squite simple. A considerable proportion of the locomotives on each line are of a compromise type. One road may consider these as primarily freight engines, while another distributes them, using some basis such as locomotive kilometrage.

It must be understood that within the classes, Passenger, Goods, and Shunting, there is a wide variety of type, not only on the same line but as between different lines. One of the common bases for classifying locomotives is the wheel arrangement. Thus the classification according to service, used above, is subject to a further classification on the basis of wheel arrangement. This was observed by the lines in making their reports to the Ministry. But there is another great diversity in physical characteristics. Each country has impressed a certain individuality upon the railway equipment manufactured within its borders. Under the terms of the various loan agreements in China, orders for equipment are placed usually with the factories in the nation of the loaning financiers. In the absence of contrary specifications, the current standards, naturally, are followed, and the several national types have thus been introduced into China. A complete classification of locomotives on the basis of service, wheel arrangement, and national type would amount almost to a publication in detail of the report from each individual line. Such a list would suggest, pointedly, the need for a standardization of specifications. In any country it is a prime necessity to have the highest degree of uniformity upon its railroad. Otherwise, the field of operation of any one unit is severely limited. Through traffic must surely increase. Under such conditions, economical repair, equalization of shortage and surplus at different points, and many other features of efficient operation and management require that the several lines shall use equipment of a similar type.

(1) Japan	(1921)	45,350	kilometres	per	locomotive.
France	(1912)	36,772	,,	,,	,,
United Kingdom	(1914)	40,583	,,	,,	,,
United States	(1922)	38,500	,,	,,	,,

New Motorship for Java Trade Launched

THE Furness Shipbuilding Company, Ltd., Haverton Hill-on-Tees, successfully launched on January 14, the twin-screw motorship *Java*, which is being built for Messrs. A. S. J. Ludwig Mowinckels Rederi, Bergen Norway.

The *Java* is a tanker of the poop, bridge and forecastle type, built of the longitudinal system of framing to Lloyd's highest class for carrying petroleum in bulk. The arrangement of the tanks, spacing of bulkheads and scantlings have been specially designed to suit the heavy nature of the Java molasses cargo service.

The principal dimensions are:—Length 488 feet; beam, 62 feet 3 inches, and depth, 35 feet 4 inches. A deadweight of over 12,500 tons is carried on the load draught.

The adoption of the builders' multiple drilling system has been a feature of the construction. This system is noteworthy for rapidity of construction and exceptional excellence of workmanship, a point which is of special importance in oil tank vessels. The main tanks are fitted with very ample steam heating arrangements, also steaming out, fire extinguishing and ejector pipes. The summer tanks are fitted out with steaming out, fire extinguishing, and ejector arrangements.

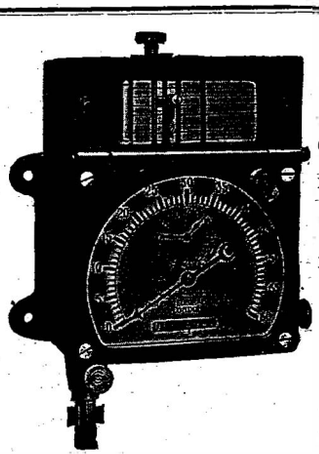
Stowage for fuel oil is provided in the fore peak, the two forward deep tanks, the oil fuel bunkers, port and starboard at fore end of machinery space, and in the double-bottom tank underneath the engine room. This arrangement enables the vessel to have a radius of 29,000 nautical miles under service conditions. Water ballast spaces are provided in the fore and after peaks and in the double bottom aft for satisfactorily dealing with the trimming of the vessel. The 'tween decks forward and cargo hold above the oil fuel deep tank are available for cargo or stores, and are served by a hatch and 3 ton derrick with a 7 inch by 12 inch steam winch. A 3-ton derrick with 7 inch by 12 inch winch is also fitted abaft the bridge deck. The bridge 'tween deck is available for cargo. A powerful steam windlass is fitted on the forecastle and a 10 inch by 10 inch steam capstan on each side of the poop deck for wharfing and mooring purposes.

The steam steering gear is of the Wilson-Pirrie type controlled by telemotor, installed in a teak wheelhouse on the navigating bridge amidships. An additional control is also fitted on the top of the deckhouse. Special attention has been paid to the life saving appliances, Graham's patent single davits being provided for the four life boats. A motor boat and a cutter are also supplied.

Accommodation of a spacious and comfortable character is provided for the crew to meet the special requirements of the Sjofartskontoret. The captain's suite is situated in a steel deck house on the lower bridge, and consists of a large and comfortable sitting room, well furnished bed room, with private bath and w.c. adjoining. The officers are berthed in large rooms in the midship deckhouses, also four staterooms furnished in a tasteful manner, together with a spacious dining saloon furnished in polished mahogany, a comfortable smoke room fitted out in oak, and a sitting room furnished in white. The engineers are berthed in separate cabins in the poop deckhouse, together with smoke room and mess room finished in ash. The greasers and cooks, with separate lavatory and mess, are berthed in the poop, and the seamen in the forecastle, also having mess and ample lavatory accommodation. The main galley with two large ranges and cooking boiler is fitted in engine casing and separate pantries with hot press, hot water boilers, etc., are provided for the mid ship and after accommodation. The hospital with bath and w.c. and the apprentices' cabin are situated in the bridge 'tween decks, together with the carpenter's shop and stewards,' bonded and vegetable stores.

Special attention has been paid to the lighting and ventilation of the accommodation, as the vessel will trade in tropical climates. The captain's rooms, and saloon and smoke room are fitted with patent window lights, and the portlights elsewhere are of ample proportions. Separate cowl vents are fitted to each cabin, and mosquiot screens are fitted to all cabin doors, lights and ventilation.

The accommodation is fitted with steam heating throughout, and the electrical installation has been carried out by the builders' electrical department, the electrical plant consisting of two generating



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WITH CONJUGATE MOVEMENT

TELOC TYPE

Chart Feed on a Mileage Basis of 10 m/m per Mile.

INDICATES:—Speed.
Total mileage since application of Instrument.
Total mileage of each run.
Time of Day in Hours and Minutes.

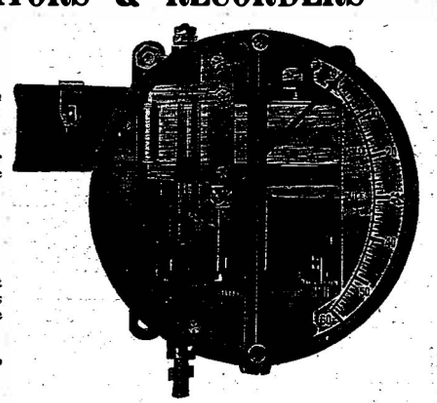
RECORDS BY SILVER STYLUS:—Speed attained at any point of run.
Time the engine or coach is at work.
Distance covered.
Duration (up to 24 hours) and point of stops.
Time of Day in Hours and Minutes.
If desired apparatus to record working of Westinghouse or Vacuum Brakes.

HASLER TYPE

Chart Feed on a Time Basis of 4 m/m per Minute.

INDICATES:—Speed.

RECORDS BY NEEDLE PUNCTURES:—Speed attained at any point of the run.
Time the engine or coach is at work.
Distance covered.
Duration and point of stops.
If desired bell can be fitted to ring at predetermined speed, or apparatus to record working of Westinghouse or Vacuum Brakes.



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THE FAR EASTERN REVIEW

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遠東時報

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"BRITAIN'S HONORABLE ALLY."
"JAPAN'S RIGHT TO EXIST."

Vol. XXII | May, 1926 | No. 5

A.L.TAYLER

The Construction of the Chinese Eastern Railway Company

A Russian View

By A. Borissoff

This article was written for the "Far Eastern Review" by one of the agents of the Economical Section of B. V. Ostroumoff's organization, which at the present time, is engaged in extensive construction and industrial work in Manchuria. Mr. Ostroumoff was formerly Managing Director of the Chinese Eastern Railway.

THE construction of the Great Trans-Siberian Railway was going in full swing, quickly nearing the town of Chita. And still the question of the further direction, which this great trunk-line was to assume towards the East, in the direction of Vladivostok, remained unsolved. A plan of constructing the railway following the Amur river along the frontiers, between Russia and Manchuria, existed, but this was a round about way.

The Amur river enters the Russian border at sharp angle. This would make the line too long. The fact, naturally, gave birth to the idea of following the straight line towards Vladivostok, across Manchuria; this would shorten the railway by about 2,000 versts.

But the problem of obtaining a concession for the construction of a Russian railway on foreign territory appeared to be uncommonly difficult.

And yet the aim pursued by the constructors of the great trunk line imperatively demanded that this shortest way should be followed. Emperor Alexander III on whose initiative this huge construction was started, considered, that the Siberian Railway was to form a link between Russia and Europe on one side and Japan and the Far East on the other, becoming one of the great transit highways of the world. In the eyes of the Emperor the Siberian railway was to have an exclusively economic importance. Its importance for Russia was in the possibility of a direct communication between the Russian Maritime Province and the other parts of the country, and for China and Japan—a link between these countries and Europe.

Still a third variant of the direction, which should be adopted by the future railway, existed. Badmaieff, a Buriat physician at that time residing in Petrograd, strongly recommended the construction of the railway in the direction from Verhneoudinsk to Urga and then on through Peking towards one of the ports of the Pacific. This project proposed by the Buriat doctor, who well knew the life of the Far East and the political organisation of the Chinese Empire, had, undoubtedly, great advantages. A more detailed study of the project would, probably, have modified it and excluded the first supposition of the Doctor to construct the line in the direction of Peking. The Chinese capital would, probably, have been left aside and a shorter way—along the Mongolian territory—via Dolon-nor, Jehol and Chin-chow—adopted. The direction would, certainly, have been shorter and more convenient for the great world transit highway across Siberia and Mongolia. But this project, probably, frightened Doctor Badmaieff's contemporaries by its novelty and daring.

It was for Count S. J. Witte, at that time Minister of Finance of Russia, to make the final choice between the different variants proposed, as the whole work of the construction of the railway was, by the will of Emperor Alexander II—entrusted to him.

It may be seen from Count Witte's writing, that Badmaieff's project was not sufficiently well studied and understood by him. Witte well knew that Badmaieff was working on questions, relating to the Far Eastern problems. He admitted, that the Doctor "was, undoubtedly, a very clever man," but, in Witte's opinion, his work was "always attached to some intrigues or political questions," that he tried "to make his occupations a source of all kinds of financial affairs." For these reasons Witte tried to keep Badmaieff away from the final solution of the question of the direction to be chosen for the new railway and ceased all relations with him. His project was abandoned. And yet, many of the reasons the Doctor put up in favour of his project, were worthy of consideration. Badmaieff tried to prove, that the Vladivostok direction could only have a secondary importance, as compared to the direction proposed by him, and he was right. Considering the Great Siberian Railway as a world trunk line, Badmaieff well understood, that the direction recommended by him would be shorter and more convenient. Vladivostok freezes in winter and this great drawback does not exist in the other ports of the Pacific. The coast of the Liaotung Bay, one of the points, which was to be the terminal of the new line, was, certainly, more centrally located as to world trade and, therefore, the services rendered by this direction of the Trans-Siberian would have been much greater in the direction of Vladivostok.

C.E.R.: The Spiral Climb over the Khingan Mountains

Count Witte, in addition to his lack of personal sympathy towards the author of the project, had two reasons, according to his own words, for not supporting Doctor Badmaieff's project. First, Witte was thinking of the development of the Russian port of Vladivostok, and second—he considered that the construction of a Russian railway to Peking, would raise all Europe against the Russian Government.

It must be noted, however, that this latter apprehension of Count Witte was, certainly, not as well founded as it appeared to him. Very probably, after a more thorough study of the project and its detailed discussion with the Chinese Government, the Peking direction would have been abandoned and the railway would have followed a more direct line towards the Pacific coast, leaving Peking aside.

Out of the two remaining variants for the construction of this part of the Siberian railway, Count Witte chose the shortest direction—across Manchuria.

It was necessary to obtain China's approval to this project and Witte resolved, for this purpose, to take advantage of the visit of the Chinese high dignitary, Li Hung-chang to Moscow. Li Hung-chang was to assist at the festitivites of Emperor Nicolas II coronation in Moscow, as representative of the Chinese Emperor.

The political situation at that time was extremely favorable to such negotiations. Russia had only a short time ago rendered two great services to China. According to the treaty of Shimonoseki, concluded between Japan and China after the end of the Sino-Japanese war, the results of which had proved disastrous to China, Japan demanded the annexation of the Liaotung Peninsula. Russia supported China at the time and the principle of the intangebility of Chinese territory proclaimed by her, was, at that time, supported by the other European powers and the United States of America. Japan was forced to yield and to accept a financial compensation, instead of the territory it was hoping to obtain, according to the Shimonoseki treaty.

After this, owing to guarantees given by Russia, China was able to obtain a loan in France, granted by four French Banks.

The impression of these two friendly services, rendered to China by Russia, were still fresh in the minds of all Chinese. Witte reminded Li Hung-chang of them, when starting his negotiations with him and tried to impress upon him the importance the Trans-Siberian railway would have for China, especially should that railway be continued through Manchuria. Witte told him that, in case of any international difficulties, which China might experience Russian support could only prove effective, in case Russia would be able to transport her military forces into China quickly and efficiently from European Russia and the Maritime Province. Military assistance otherwise would always come too late if no railway existed, as had been the case during the Sino-Japanese war.

Witte, likewise, emphasized the great importance of the new railway for the economical development of the Russian and Chinese province through which it was to run. Japan, on her side, could have nothing against the construction of a railway line across Manchuria, furthermore that country was interested in the most speedy achievement of the Siberian railway. This railway was to give Japan the possibility of coming nearer to European markets and the countries of the Far East. The great technical and industrial progress Japan had attained in late years stimulated her friendly attitude towards the construction of the railway.

In his memoires Count Witte remarks, " of course Li Hung-chang brought up various obstacles." But a careful study of these negotiations shows that on the contrary Li Hung-chang's attitude towards these negotiations was most friendly. In fact, no dissensions that could be considered as obstacles cropped up during the negotiations ; it was only a difference between European and Asiatic ideology in questions of International Law that came to light and a different understanding by the two parties of what was admissible and acceptable for China in the way of the construction of a railway by foreigners on Chinese territory.

It was not Li Hung-chang's first experience in the dominion of railway construction. He had worked for thirty years on these questions and he certainly has his own well formed opinion on the question of railway construction in China.

For the first time in 1863 had Li Hung-chang to discuss the question of the construction of foreign railways in China—at that time he was Governor of the Province of Kiang-Su. The Shanghai foreign firms had entered a plea for permission to construct a railway between Shanghai and Soochow. The funds for the construction were to be supplied by foreign capitalists. Li Hung-chang flatly refused to grant the permission requested. His reason was the over-population of the country and the difficulties that would be experienced in obtaining land for the railway line. He, likewise, indicated, the unfriendly attitude of the Chinese population towards foreigners. Li Hung-chang voiced his apprehension that the misunderstanding, which would certainly arise in the process of the expropriation of land for the railway and different other circumstances, might render this public feeling against foreigners more acute. Li Hung-chang considered, in principle, that China was certainly in need of railways, but that these ought to be Chinese, not foreign. Later on, when he became Viceroy of Chile, he granted a Chinese company the permission for the construction of a railway line to the Kaiping coal mines ; this line, later on, was prolonged as far as Tientsin. In the spring of 1893 this construction was continued towards Chinchow. Li Hung-chang's plan was to, later on, continue that railway from Chinchow to Moukden, via Sin-Min-Tin. It was, later on, proposed to continue that line to Hunchun.

The line planned was to run through the parts of Manchuria, which, at that time, were populated by Chinese. In those days, the Liaotung peninsula was densely, populated by Chinese, as well as the coast of the Liaodun Bay to the east of the Willow edge. To the north of Kaiuan Chinese colonies became less numerous and in North Manchuria formed only rare oasises, mostly in the vicinity of the few cities, which existed in that part of the country. In the confines of Mongolia, Chinese settlements existed only on the highway between Tsitsihar and Bodoune and in the vicinity of that town. The line of Hunchun, proposed by Li Hung-chang was to cut off the part of Manchuria populated by Chinese,—from the others. The region where the Russian railway was supposed to pass remained as yet untouched by Chinese colonisation. This region was divided into many autonomous principalities, part of which were under the sovereignity of the Manchuria dynasty and partly forming old Manchurian lands, which had at all times belonged to that dynasty.

The western part of that region, from the Russian border to the Hin-gan was occupied by Barga, which had its own Governor and enjoyed broad autonomy. The Hin-gan region was populated by a nomad tribe of Orochons, ruled by their own dignitary. In fact their dependence from the central government was purely nominal.

Further from the Hin-gan to the river Nonni were lands populated by Solons and Danours, ruled by their chiefs. These tribes were organised into different colonies and in military and political matters were supposed to depend from the Touchoun of Heilung-kiang. Although these tribes, likewise, enjoyed autonomy, still their dependence from the Manchurian powers was much greater than that of the inhabitants of Barga. Further to the east of Tsitsihar went the Mongolian dominions of the Princes Dourbet, Gorlos and Minnai-Olt. These dominions went nearly as far as Harbin. The Mongolian princes were considered to be sovereigns by right of inheritance, but dependent from the Bogdo-Khan.

To the east of Harbin, as far as the Russian border—there were Manchurian possessions. All that region, at the time, was not a Chinese province, neither as to population, nor as to government. This part of the country was a conglomeration of small government formation, which formed a part of the Chinese Empire, but, owing to the special conditions on which they submitted to the Chinese Emperor, enjoying special autonomous rights.

This circumstance was evidently fully discounted by Li Hung-chang in his negotiations with the Russian Government, but Russian officials were absolutely unaware of the facts and considered China as a usual unified State instead of looking upon it as on a complex of states—or a union. In the Russian mind the name of China was synonimous of the whole Chinese Empire—understanding all parts of the Empire as an undevisable unit. Instead of this, the Chinese Empire consisted of several states such as : Manchuria, Mongolia, Thibet, China and Turkestan, which were united under the rule of the same dynasty.

This different understanding by the two contracting parties of the constitution of the Chinese Empire was, naturally, bound to have an influence on the negotiations ; misunderstandings arose, which both sides were inclined to explain as the desire of the other side to create difficulties in a matter, which both of them considered

desirable and both thought perfectly clear; in reality, a grave misunderstanding between the two sides existed all along.

The Asiatic method of thought in the matter of the construction of a railway in Manchuria was clearly manifested in the negotiations between Li Hung-chang and Count Witte, as well as in the contract for the construction of the Chinese Eastern Railway. Nevertheless, the fact that the negotiating parties did not have a sufficient knowledge of each other, created the result, that a question perfectly clear to Chinese was incomprehensible to the Russians and vice versa. The Chinese often insisted, that certain paragraphs be inserted in the contract, which, in their mind, clearly defined the conditions of the understanding. The Russians, on their side, considered these paragraphs unnecessary and superfluous, thinking that they only represented the usual Chinese formulas of Eastern eloquence. This was the cause that at the very conclusion of the contract the two parties differently understood its conditions.

Count Witte's Memoires, now published, in their parts relating to the conclusion of the contract, clearly show this difference in the understanding of the various clauses of the pact.

Count Witte states, that Li Hung-chang, before beginning negotiations on the details of the contract, gave him to understand, that China's consent to the construction of the railway could only be obtained if Li Hung-chang had the assurance that the conclusion of the contract was desired by the Russian Emperor himself. A minister in Russia had not the right to negotiate any important questions with a representative of a foreign nation without having previously obtained the Imperial sanction of such negotiations: it was, therefore, clear, that the question of the construction of a Russian railway in Manchuria raised by Witte, had been previously submitted to the Emperor and was in conformity with his wishes. Li Hung-chang's desire, therefore, appeared rather strange to Witte. But Li Hung-chang considered, that China's consent to the construction of such a railway would be an act of special importance, that whilst allowing the Russians to penetrate into his country, the Chinese Emperor must have full assurance, that this step would have no bad consequences for China, and, therefore, wanted to obtain a full guarantee of Russia's sincere friendship towards China. The Emperor alone could give such an assurance. The formula "for the sake of the friendship, which has now begun," which rendered it possible to consent to all kinds of concessions for the sake of fortifying the links of peaceful friendship was an old one and for centuries had been used in the diplomatic relations between China and Russia. Li Hung-chang's desire to have a confirmation from the Emperor himself of the promises given by this formula was a result of his understanding, that this was the only real guarantee, which could be given, that Russia would keep her promise, resulting from the contract signed. Witte's Memoires and all the events that followed closely, show that Witte himself and the governing circles in Russia looked upon the desire of the Chinese dignitary as on a pure formality, demanded by the ritual of the usual Chinese ceremonies. The spirit of Li Hung-chang's desire to hear the Emperor's own words expressing his wish to have a Russian railway built in Manchuria in return for the services rendered to China by Russia, was never understood.

Count Witte states, that during the discussion of the details of the understanding, Li Hung-chang placed as first conditions the demand, that the railway should be built by a private Company. In no case would he accept, that the latter should be built by the Government or should belong to the State.

The contract on the building of the railway clearly emphasizes this point, running as follows:

"The Chinese Government . . . . . grants the construction and the running of the railway to the Russo-Chinese Bank on the following conditions: the Russo-Chinese Bank undertakes to form a Company under the name of Chinese Eastern Railway Company for the construction and exploitation of said railway. The seal, which will be used by the Company will be granted to it by the Chinese Government."

According to the Asiatic minds, an understanding of the contract, the mutual relations of the Russian Government, the Chinese Government and the Railway Company—could not be more clearly defined. Li Hung-chang considered, that the text of the understanding, drawn up by the Russians and himself, completely eliminated the Russian Government from the construction and exploitation of the Chinese Eastern Railway. According to the contract, the Chinese Government grants the construction of the railway to the private Russo-Chinese Bank, which, if necessary, finances the railway. This Bank, having the trust of the Chinese Government, must form a private Company, which must build and run the railway; the Russian Government must take no part whatever in the exploitation of the line. In this way, the Company which, as is clearly said in the contract, to allow its functioning in Chinese territory, gives it its seal; this, if expressed in the European manner, meant, that the Chinese Government grants the Company its power and rights. In this way, the railway Company obtained its right of administration in the railway territory. These administrative rights obtained as a result of the seal by the Chinese Government, were in absolute conformity with the usual Asiatic custom. They were absolutely identical to the rights of the ruler of Barga, of the Manchurian Zien-Ziuns or the Mongolian Princes in their respective territories, and placed the Railway Company in the same situation towards the Chinese Government, which was occupied by these princes. As a result it was, likewise, understood that the Company was to be responsible before the Government for the administration of the railway zone in conformity with the rights obtained. In the Chinese mind, the fact that the Russian Government had agreed to the paragraph of the contract saying that the Company would receive its seal from the Chinese Government—meant that Russia had once for all abandoned its rights to interfere in the Company's business and had agreed to its full submission to the Chinese Government.

In Li Hung-chang's eyes the fact, that the Railway Company received grants of land, which it needed and enjoyed the exclusive right of administration in the railway zone, did not represent any special privilege to Russian subjects in the confines of the Chinese Empire. The Chinese mind clearly understood, that the Railway Company was placed in the same position, which was enjoyed by all the other government formations and administrative units existing in Manchuria, which had obtained their rights and power through the granting them of their respective seals by the Chinese Government.

The exact conformity of the Company's acts, its obligations, assumed in front of the Chinese Government had a special importance in the eyes of Li Hung-chang. To prevent the possibility for the Company to interpret in too broad a manner its administrative and other rights in the railway zone, the following clause was inserted into the contract: "The President of the Company will be appointed by the Chinese Government..... the President's special duty will be to see to it, that the Bank and the Company should fulfill exactly their obligations assumed towards the Chinese Government....." (Paragraph I of the Contract).

In this way, the Chinese side of the two contracting parties considered that the dependence of the Chinese Eastern Railway Company from the Chinese Government and its responsibility, in case of infingement of rights obtained, or the unfulfillment of its obligations assumed, were fully established and guaranteed by the Contract.

Unfortunately, the Russian negotiations had an absolutely different understanding of the mutual relations between China and Russia, which resulted from the pact concluded in 1896. Count Witte, in his Memoires, gives a detailed picture of the way in which the Russian Government and himself understood the rights granted to Russia by the contract.

Witte, speaking of the desires voiced by the Chinese at the conclusion of the contract says: "The Chinese Eastern Railway Company had, therefore to be formed. This Company, certainly, always was, and now is—fully under the control and at the orders of the Government. The only difference is that, as the Company is officially registered as a private concern, and as all private Companies are controlled by the Ministry of Finance, the employees of the Chinese Eastern Railway are not governmental employees, but are in the same situation as employees of private railway companies, and are considered to be temporarily attached to the private Chinese Eastern Railway..... Then we will have the railway zone at our disposal for the necessities of the new line. We will be absolute masters in this zone, which means that we shall have the right of maintaining our own police and railway guard.....In this zone Russia, or more exactly the Chinese Eastern Railway—will be the sole ruler....." (Count Witte's Memoires, volume I, page 48).

Count Witte and the public opinion on the great advantages obtained by Russia in the railway zone, which made that country

fully master in the territory, did not consider these advantages as a diplomatic victory of Russia, whose diplomacy had lured the Chinese into signing a contract highly advantageous to Russia, the real purport and meaning of which were not fully understood by China. Witte considered, that these advantages were only a logical result of the whole complex of the negotiations. It was in the understanding of the meaning of these negotiations by each of the contracting parties, that the European and Asiatic points of view on the whole question most clearly appeared. And both contracting parties were right from their own point of view. The question of the principles, on which were based the relations of the Railway Company towards the Russian and Chinese Governments had never been discussed. The way these relations were understood by the contracting parties, or what lawful forms these should assume, was not defined during the negotiations. Both parties were fully satisfied having entered into the text of the contract the formulas, which, in their opinion, would clearly establish the meaning of all details of the misunderstanding. The Chinese considered this formula to be the clause of the contract establishing the granting of the seal to the Company by the Chinese Government.

The Russians, on their side, gave the greatest importance to paragraph 5 of the contract, establishing that: " all crimes must be judged and legal procedure, etc., organised on the railway zone by the local authorities on the basis of the principles established by international treaties."

The pacts and treatise concluded between China and Russia clearly established the extraterritoriality of Russian subjects on Chinese territory. Therefore, Russians, as well as all other foreigners were not subject to the jurisdiction of Chinese Courts or to the organs of Chinese Administration. Paragraph 5 of the contract confined this right for all Russians in the railway zone. Paragraph 6 of the same contract still enlarged these rights by granting the Railway Company the administration of the territory given to the Railway. For this reason Count Witte and the whole Russian Government considered, that the Railway Company, having obtained full powers from the Chinese Government to develop its activities in the Chinese Eastern Railway Zone, continued to remain under the absolute control and full jurisdiction of the organs of the Russian Government. Therefore, as the Company was to become full master in the railway zone, owing to the contract signed with the Chinese Government, this gave automatically the same rights to the Chinese Government.

The question of who really retained all rights in the railway zone—became most intricate and complicated in view of the fact that it was quite unusual for the Chinese Government to abandon part of its own rights to a private foreign company. Having ceded its rights of administration to a private foreign Company, the Chinese Government could no longer be considered as the subject of right, but at the same time sovereign rights in the railway Zone, as on a part of Chinese territory continued to belong to China.

According to the pact of 1896 and the contract on the construction of the Chinese Eastern Railway, the Chinese Government having granted the Company the lands, which it needed, had, simultaneously ceded to the Company the exclusive and absolute right of administration in this zone. This cession of rights to the Company had a personal character and, therefore, the Russian Government, from a strictly legal point of view, did not obtain the right of the establishment of its own administrative regulations in the railway zone.

For this reason the Railway Company having received the right of sole and exclusive administration of the railway zone from the Chinese Government working on a territory under Chinese sovereignity, should be, it appeared, in certain relations to China.

On the other hand, it was certainly impossible to ignore the facts, that the Company itself formed according to the laws of the Russian Government and that the Russian subjects—agents and employees of the Company, enjoying the right of extraterritoriality continued to remain in all respects under Russian jurisdiction. It was, therefore, impossible, to think of the possibility that the Company formed of Russian subjects could disobey the orders of the National Government.

It was in view of these considerations, that the Russian statesmen were of the definite opinion, according to the contract on the construction of the Chinese Eastern Railway, Russia had obtained all the rights in the railway zone.

Nevertheless, in the beginning of the existence of the Railway, the Railway Company was really the ruling force in the railway zone. The military forces, for the protection of the railway were created by the Company and under the latter's orders. In fact, these forces were nothing but freely hired employees of the Company.

The uniform of the employees of the railway guard, the way they were enrolled—all being officers and soldiers having ended their obligatory military service and now in reserve,—all this proved that they were not a military force, but just the Company's employees, the hiring of which was considered necessary in the interests of the administration of the railway zone. This was in conformity with paragraph 5 of the contract.

Some of the employees of the railway guard were entrusted with police duties. The existence of such an armed guard, as an agent of the Company, was not against the contract and fully in conformity with Asiatic customs. The same rights were enjoyed by all other government formations in Manchuria, which had obtained their seals, which they used in their administrative function from the Chinese Government.

When signing the agreement on the construction of the Chinese Eastern Railway, Li Hung-chang had inserted another vital condition. The railway line was to cross Manchuria from China to Vladivostok, following as far as possible, the shortest line. At the time, as it appears from Count Witte's Memoires, Li Hung-chang had explained the motives of this advice, which, at the same time, was a demand.

Witte says in his Memoires: " Li Hung-chang, with whom I had become quite friendly several times repeated to me that, being a friend of Russia, he could in no way advise Russia to go south of the railway line, which was to bind the Trans-Siberian with Vladivostok. In his opinion, our moving southward could create such political disturbances and unexpected incidents in the Chinese masses, absolutely unknown to foreigners and looking upon every white man as upon a foe, that a similar step could have the most sad and unexpected results for both China and Russia.

This advice of Li Hung-chang had a very great political importance. In fact, Li Hung-chang in his conversations with Witte, tried to explain to him the necessity for Russia to establish beforehand a definite zone of her influence in the Far East. An unbounded agrandisment of this zone could have the most serious consequences, spoil the friendly feelings existing between China and Russia. As mentioned above, the Liaotung Peninsula, Kwantung especially, was densely populated by Chinese. The colonisation was an old one, Chinese settlers had lived here for centuries. The Chinese Government had the intention of broadening the zone of colonisation in South Manchuria. The extent of the colonisation planned was made clear by Li Hung-chang's project of the building of a railway line between Chinchow and Hunchun. In accordance with Chinese custom, the Chinese Government considered all territories populated by Chinese as its belonging, as on an enlargement of the confines of Chinese. The appearance of Russians in a zone intended for colonisation, especially in one which had already been colonised, could always be considered by the Chinese Government as a vital menace to the colonisation policy. The granting of land tracts to the railway could easily create an unfriendly feeling in the minds of the Chinese living in Manchuria; these Chinese were to the Russians in relations quite different from those they were towards the various Manchuria and Mongolian tribes.

All this compelled Li Hung-chang to consider that to prevent possible misunderstandings, it was absolutely necessary for Russia to define the sphere of her influence in Manchuria. With the construction of the railway Russia was to come into closer contract with the Mongolian and Tungus tribes, populating North Manchuria. China wished to maintain its sole influence in the Liaotung Peninsula and the neighbouring regions of South Manchuria.

Unfortunately, all details of the life and political organisation in the Far East were unknown in Russia. The friendly feelings between the contracting parties were sincere, the negotiations proceeded in an open and friendly manner, giving full consideration to all desires voiced by the opposite party. All desires expressed and speeches made by both parties were accurately translated from one language into another and nevertheless, the lack of mutual knowledge of the contracting parties—China and Russia—created the situation that, notwithstanding the translations made, the parties continued to speak two different languages.

All later events, the occupation of Tsingtao by the Germans, of Port Arthur by the Russians and the construction of the Southern Line of the Chinese Eastern Railway—brought about an armed conflict between Russia and China. The re-establishment of law and order in the country did not re-establish the former friendly relations. The Russian interpretation of the contract became still broader. A policy of expansion was inaugurated in the railway zone, based on the allegation that all power and right in the zone belonged to Russia.

The Russian revolution and the fall of her national prestige brought about a change in the opposite direction. China assumed Russia's policy of political expansion. This intricate situation was in no way cleared up by the new understanding, concerning the Chinese Eastern Railway, concluded by China with the Soviet Government. On the contrary, it still more obscured the situation, breaking the basic principles of the construction of the railway, laid out in the contract on the construction of the line, by declaring that the railway belongs not to a private Company, but to the Russian Government in conjunction with the Government of the Chinese Republic.

* * *

Steel on the Japanese Railway

THE Imperial Government Railways of Japan apparently do not spare trouble in investigating the materials that they must rely upon for the all-important maintenance of an efficient traveling service. Their recently conducted tests of steel rails supervised by Mr. Yoshio Uyemura indicate a very thorough examination and should prove of considerable value to both makers and users. Since the I.G.R. system has grown to its present dimensions within only forty years one can but marvel at the skill and perseverance which their engineers have shown in the face of almost insuperable difficulties.

It was not much more than forty years ago when Japan first determined to discard her old isolation policy and to come into line with Western ideas. From the outset it was necessary that the Government should consult and accept the specialist opinions of foreign engineers and adopt their methods to the peculiar conditions in Japan. As each new process received its trial in other countries so too did Japan fall in line and subject it to test in this country. The replacement of an entire rail system is an extremely costly item and the I.G.R. is to be congratulated on the way it is preparing to tackle the proposition.

During the past forty years tremendous strides have been made in the production of steel and during this period many new processes have been tried and abandoned. Those who are acquainted with the production of steel, and also those who may have but caught a glimpse of the colossal Government Steel Works at Yawata, know the enormous capital cost of new furnaces and can appreciate the difficulties to be overcome by steel manufacturers.

Acid Bessemer, Basic Bessemer, Siemens, Acid Open Hearth and Basic Open Hearth Processes have all taken their turn in the progress of science and indeed the products of each process has still some peculiar advantage to recommend it for particular uses; but it is now generally accepted that Basic Open Hearth Steel is undoubtedly the best for all structural purposes.

Mr. Uyemura's report confirms the above statement but perhaps leaves a rather unfortunate impression with laymen that some American and British makers produce only poor quality steel.

Two of the worlds oldest established firms, Messrs. Carnegie and Messrs. Bolckow Vaughan, have received particular mention. Both these firms have been in the forefront with experimental work and have produced steel of every kind. As new processes were discovered they lost no time in equipping their works and making the products, thus giving every possible advantage in the choice of materials. Other firms, less favorably placed financially, were unable to follow their lead, and thus escaped the unfortunate experience, often the lot of pioneers, of having incurred heavy expenditures without deriving much ultimate personal benefit.

Messrs. Bolckow Vaughan, whose works line the River Tees at Middles-brough, England, and are as large as those at Tawata, produce 800,000 tons of pig iron and 500,000 tons of steel ingots per annum. This firm was founded in 1851 and its history has been marked by a singularly progressive attitude. When the epoch-making discovery of Bessemer first became known it was Bolckow Vaughan & Co., who first adopted the new process in the Cleveland district. Later they placed their staff and plant at the disposal of two eminent scientists the outcome of which was the Basic Bessemer process that has produced so much of the early good quality steel.

Years later, the development of the Siemens Process brought about striking improvement in the quality of steel. With the adoption of the Basic Open Hearth Furnace a process was at last found which could hardly be improved upon and it is not generally accepted that Open Hearth Steel made under conditions such as are found at the Bolckow Vaughan Works has no rival.

Exhaustive tests and experiments have proved that Basic Open Hearth is actually just as capable of resisting prolonged strains as acid open hearth, so that the advantage claimed by the latter is now rather discounted. In the near future, when the industrial life of Japan is highly developed, far more heavy traffic must be borne by the railroads. This will require a stronger subgrade construction and will call for a very high quality rail which combines toughness with a fair degree of hardness. Mr. Uyemura in his report states that high carbon steel rails are too brittle for Japanese conditions of lighter wheel loads and that he recommended a steel less hard but tough enough to bear up under the exacting conditions of temperature and the weaker subgrade which has so far been the rule in Japan.

Toughness gives rugged strength to a rail and prevents it being injured by accidental misuse; hardness gives surface wearing value, but the hardest type of rails on account of their brittleness should be used on first-class subgrade which is constantly maintained. The I.G.R. engineers will do well in keeping in touch with Western construction methods and products thus benefiting from the experience of their manufacture and adding to their own valuable sources of information.

Messrs. Bolckow Vaughan are fully prepared to answer any criticism of experts and are confident in submitting their products to any test whatever. As manufacturers of steel rails they claim a reputation second to none, and this is proved by the supply of tramrails to such important systems as London County Council, Glasgow, Manchester and Dublin and a regular supply of ordinary steel rails to British and foreign railway companies. Defects in previous manufacturing processes which were discovered only by the test of time have now been definitely eradicated and the new furnaces turn out a steel rail which will certainly meet the most exacting conditions.

New Passenger Vessel for Singapore-Penang Trade

Towards the end of February an order was placed through Messrs. Alfred Holt & Company, for the Straits Steamship Company, Ltd., with Messrs. Vickers, Ltd., Barrow, for a fast turbine driven two screw steamer for the Singapore and Penang passenger trade.

It is of interest to note that this is the third order booked by Messrs. Vickers within the last few weeks. They include a Donaldson motor vessel and a 20,000 tons Orient liner. On March 16 the firm will launch the new British cruiser *Cumberland*.

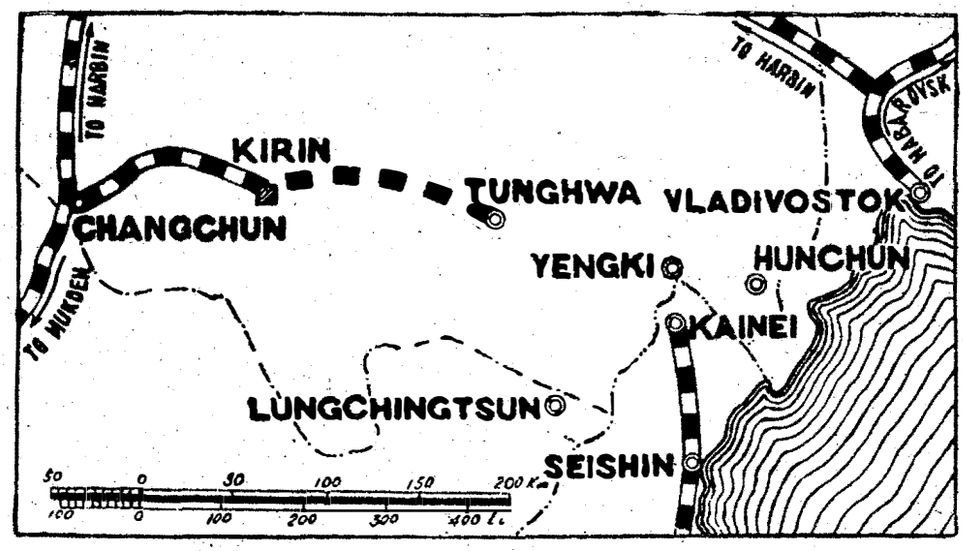
New Vessels for Dutch East Indies Trade

Messrs. L. Smit & Company's International Tug Company, of Rotterdam, have recently placed orders for the construction of two seagoing tugs of 800 and 900 i.h.p. respectively with Messrs. L. Smit and Zoon, Kinderdijk, and P. Smit, Junior's Engineering and Shipbuilding Company of Rotterdam. The Koninklijke Paketvaart Maatschappiji, of Amsterdam, whose orders for new tonnage to be used in their inter-island services in the Netherlands East Indies given in the past year have figured large in the books of the leading shipbuilders in the Netherlands, have called for tenders for the construction of five ships, all of the same size and type. This is considered an excellent opportunity for Netherlands builders who have improved their internal organization, enabling them to build high class ships in series to demonstrate the value of such improvements.

Kirin-Tunghua Railway

THE South Manchuria Railway Company is the contractor for the proposed extension of the Changchun-Kirin railway to Tunghua, and surveys are already in progress. Changchun is the northern terminus of the main line of the S.M.R.

An agreement for the construction of the Kirin-Tunghua extension was concluded with the Chinese Government as far back as 1909 by a group of three Japanese banks, the Industrial Bank, the Bank of Chosen, and the Bank of Taiwan. The scheme remained dormant for years, until, in fact, the S.M.R. arranged with the banks mentioned to take over their interests. Subsequently, in 1925, an agreement was reached with the Chinese Government whereby the S.M.R. undertook to construct the line as contractor, the railway to be and remain a part of the Chinese line running from Changchun to Kirin. This contract was repurdiated in the autumn of 1925 when Marshal Chang Tso-lin's influence was withdrawn from the Peking government, but later its legality was established.



The contractors estimate the distance of the new line at 130 miles, costing Yen 18,000,000, excluding tunnel work. The contract calls for the completion of the undertaking within two years, but, owing to the mountainous nature of the country, it is doubtful whether it can be completed in that time,

Virgin forests aggregating a thousand square li lie between the two termini. Moreover, according to one investigation only about a fifth of the cultivable land is under cultivation. A Japanese surveyor is authority for the statement that over 200,000 piculs of soya beans and half a million piculs of wheat and other cereals are produced yearly in the four districts, Kirin, Hwatien, Erhmu and Tunghua. The following table shows other principal products of the four districts, and the yearly yield :

District	Tobacco catties	Horses head	Cattle head	Pigs head
Kirin ...	1,300,000	56,000	100,000	1,000,000
Hwatien ...	5,000,000	13,000	4,000	25,000
Erhmu ...	2,700,000	20,000	1,500	15,000
Tunghua ...	500,000	11,000	1,600	18,000

The surveying parties are divided into four sections, each section comprising 15 members under the escort of 25 Chinese soldiers. Section 1 is to look after the 30-mile section between Kirin and Ehomu ; section 2, the 25 mile section between Ehomu and Imaho ; section 3 the 35-mile section between Imaho and Tashaho ; section 4, the 40-mile section between Tashaho and Tunghua.

The most difficult sections from a technical standpoint are the 25-mile section between Ehomu and Imaho and the 30-mile section running from north to south on both sides of the boundary line of Section 3 and Section 4, which are included in the forest zones.

In particular, the railway bridge over the Sungari and the three tunnels to pierce Laoyehling, Chingling, and Weihuling present the pieces of work of greatest importance on the whole line. The Sungari near Kirin is 450 metres wide. Bridge piers are to be constructed at an interval of 48 metres. All other bridges will be wooden.

The total lengths of the three tunnels will be 3,300 metres. All the hills being of granite formation, the excavation work will be very laborious, and in order to save money as well as time, the latest rock drilling machines will be used. For the provisional tunnels, the gradient will be 1-40, to be reduced to 1-80 when the permanent tunnels are excavated.

The Tunghua line has a peculiar advantage over the Taonan-Angangchi Line in that any amount of timber is available along the route, while concrete making materials are found everywhere. This will save considerable hauling and expense. Again, coal is obtainable near Chiaoho, and when brick is made available on the spot, the only building materials to be imported will be cement and rails.

Record Sales made by Dodge Brothers

Retail sales of Dodge Brothers Motor Cars and Graham Brothers Trucks by dealers in the United States in the period from January 2 to April 3, 1926, established another phenomenal record with a total of 70,599 units as compared with 51,318, a gain of 19,281, or 37 per cent. over the same period in 1925.

This high record was made in the face of bad weather conditions which prevailed throughout all sections of the United States during almost the entire period.

Shipments from the factory in the first three calender months of 1926 likewise established a new high mark with a total of 86,351 units as compared with 59,378, a gain of 26,975 or 45 per cent. over the same period in 1925.

Shipments of Dodge Brothers Motor Cars and Graham Brothers Trucks to satisfy the increasing demand of foreign dealers during the month of March reached the highest point ever recorded in the history of Dodge Brothers, Inc., with a gain of 50 per cent. over the corresponding month of 1925. This total was 4,460 compared with 2,972 in March, 1925.

A substantial increase has been made each week in retail sales of Dodge Brothers Motor Cars and Graham Brothers Trucks thus far in 1926, the latest weekly record being established for the period ended April 3, when 9,104 units were sold. This was a gain of 2,574 or 39 per cent. over the best week in 1925, that ended April 11.

The Peipiao Extension of the Chaoyang Branch of the Peking Mukden Railway

By H. Stringer, B.A., A.M.I.C.E.

THE total length of this branch is about 70 miles and the construction of the first 33 miles was undertaken in 1921 and opened for construction traffic over many deviations in the late autumn of the same year. This first portion of the line traversed fairly easy country and the construction calls for no particular comment. It is proposed to deal here with the last 37 miles—roughly from the station at Y-hsien to the terminus at Peipiao—which traversed country of some difficulty.

The survey. Grade and curvature limits. As the principal aim of this branch was the development of a colliery whose expected output was put at 6,000 tons a day, and further as a considerable grain traffic was expected to develop, gradients were limited to 1 in 135 and curves to 3½ degrees. The rapidly increasing cost of maintenance in China was also not without its bearing in fixing these limits as low as possible. It was further desired to adopt main line standards as far as possible as much of the expected traffic would pass on to this. Gradient was eased on all curves to 1 in 154 wherever maximum grade occurred. The rails were 60 pound removed from the main line.

Reconnaissance. The country being open and devoid of bush the subtense method of traversing with a fixed offset gave the best results, but a plane table survey was always run concurrently to put in detail and as a check. Ground inclinations were taken from station to station.

The detailed survey for the paper location was contoured at 10 feet intervals throughout, in country where topography demanded it. This was done with great accuracy in the earlier stages of the survey where the ground was very broken. Here the usual tacheometer traverse was run and stations checked by levelling. Contours were located from these stations by level and the positions picked up by tacheometer and plotted in the field. Later as the survey staff was depleted for construction the method of spot levelling was reverted to with tacheometer only. Also was a number of inexperienced students were sent for training in survey work the spot levelling was again extended to include the plotting of contours in the field. In this latter case the levels of each station on the tacheometer traverse were sent back to the plane-table party whose duties combined putting in the topography and also plotting contours. The contours were located by hand level on selected rays radiating from the traverse station distances from this station being fixed by tape. This with the check obtained by the spot levels taken in the ordinary way gave quite good results. The traverse stations were a maximum of 700 feet apart. If it was considered that the connection of the contours taken from each station was not accurately enough represented by sketching on the ground an intermediate station was put in by plane-table.

The scale for reconnaissance work was 2,000 feet to the inch that for paper location 200 feet to the inch. Much of the survey work was carried out in the winter when the ground was frozen to a depth of four feet. Under these conditions an iron peg was used first to make a hole for the wooden pegs, and where final pegging had to be done, only points of intersection and stations at 2,000 feet intervals on long tangents were marked permanently by stones about 8-in. square in section by 3 feet long. Arrows only were used as temporary marks for intermediate stations as these could be driven into the soft six inch layer of soil overlaying the frozen ground.

For the estimation of openings the following table was used as a general guide for culverts but it was widely departed from if inspection of the drainage area was thought to demand it. Complete drainage area plans on a scale of 2,000 feet to the inch were made for all the smaller streams up to about 4,000 acres in extent. The method adopted for drainage area measurement was the subtense traverse.

Size of arch culvert (semicircular)	*Total area* s. ft.	*Drainage area* acres	*Remarks* *Mever formula*
3-ft.	7.78	3.78	$A=4\sqrt{C}$ for steep and
4-ft.	17.55	19.25	rocky country. C
2— 4-ft.	35.10	77	is in acres.
6-ft.	36.86	84.92	

Size of arch culvert (semicircular)	*Total area* s. ft.	*Drainage area* acres	*Remarks* *Talbot formula*
2— 6-ft.	73.72	309	$A=4\sqrt{C^3}$ steep and
8-ft.	70.14	289.3	rocky country.
10-ft.	96.3	441.4	
12-ft.	125.57	628.3	
15-ft.	196.38	1143.80	
2—15-ft.	392.76	2903	

For openings 25 per cent. under requirements the double four was used and for those 25 per cent. under 8-ft. requirements the double six. The double smaller openings were also preferred where foundations were found to be poor. The three foot opening was hardly used at all, the 24-in. concrete pipe being used for drainage areas of about six acres and the double pipe up to 14 acres.

Where drainage areas were too large to measure, flood level slope and cross-sections were taken, and with an assumed constant the Kutter formula $v=47\sqrt{rs}$ was used to calculate flood velocity. The amount of banking up which was to be expected from constriction of channel up to as much as 50 per cent. was also investigated in the manner described in Kempe's Engineer's Year Book—section on bridges—page 512, 1921 edition. Restriction to over 50 per cent. was not considered advisable.

Wherever drainage areas were measurable and demanded openings of over-culvert size the Kutter formula was checked against the quantity derived from drainage area considerations only, taking run off at 100 per cent. and rainfall at an inch an hour. In point of fact this rainfall was not excessive being exceeded in one or two cases. Rough estimate of the amount of run-off actually occurring in areas with bare rock upper slopes and valley bottoms planted as a rule with millet indicated about 77 per cent. after thorough saturation. This figure from weir calculations.

Formation. The following standards were adopted :

Banks of earth and all material liable to disintegration .. 20-ft,
,, of surface rock and inferior rock .. .. .. 18-ft.
,, of first class rock .. .. 16-ft.

Slopes 1½ to 1 and in the case of rock the angle of repose, which experience showed to be never greater than 1¼ to 1.

Cuttings. These were made amply wide on account of troubles to be expected in North China from ice, and frost heave.

All soft material 25-ft. wide slopes not less than 1 to 1.

Good but not first-class weathering rock 20-ft. wide and slopes of ½ to 1.

First class rock 18-ft. with slopes ¼ to 1. Caution to be used in placing rock in this category.

As would be expected in very broken country it was found economical to run many of the cuttings to bank. For this purpose decauville track was used of a gauge of 2-ft. 6-in. with 16-lb. rail on steel sleepers in lengths of 16-ft. Tubs were of about 18 c. ft. capacity, some 6 miles of track and 270 tubs being employed fully during the working season. Questions of economic length of haul were gone into taking into consideration the expected price of the extra land required for borrow and stacking in the cut, the price of bank built from borrow, and balancing this against the cost of haul which averaged 2 cents per chain 100-ft. being free. Further the contents of the cut were often a controlling factor in this connection, rock often compelling the adoption of half borrow half haul method

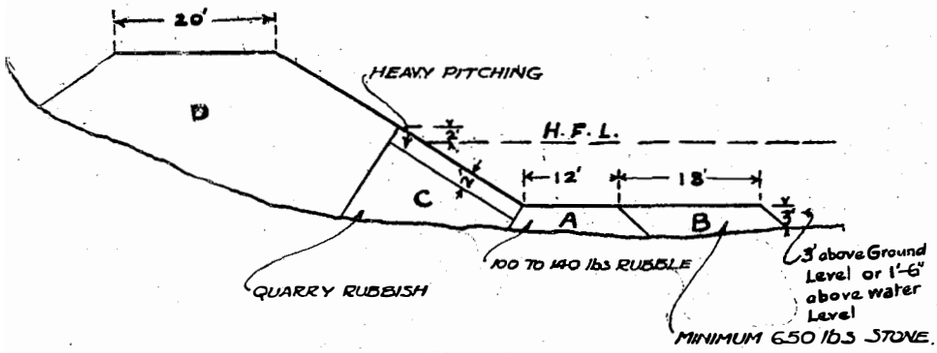


Figure 1.

of bank building. Further for banks of lenghts over 2,000-ft. and heights over 30-ft. haul from spoil pit above formation level is unquestionably most economical in China. For calculations of centre of gravity of a section of bank or cut the following approximate formula was used :

$$\text{centre of gravity is } x\ \frac{(20 - 1.5 \times \tan a)}{(3 \quad 4 \quad)} \Big/ \frac{20 - 1.5 \times \tan a}{2 \quad 2}$$

where " x " is distance to tip head or cut face, 20 the bank formation width, 1.5 the bank slope for a $1\frac{1}{2}$ to 1 slope and " a " the approximate angle of centre line slope estimated from the profile of the line.

The most interesting piece of formation work, on account of its somewhat experimental nature, was the two miles of heavy protection work where the line was located in the bed of the Ta Ling River. This river is a considerable stream in times of flood. Rough gaugings during the high flood of August 1923 gave the following approximate discharge data : Width 2,000-ft., depth 12 to 15-ft., velocity 14-ft. per second, estimated discharge 180,000 c. ft. per second. The form of protection adopted was as in the diagram below, this having been tried on a smaller scale on the construction of the main line in 1902. The rock used for protection was a hard black basalt which out-cropped at this point along the river edge.

This stone had in the case of one quarry the well known columnar structure and stone could be quarried almost without the use of powder of 10 cub. ft. in size and lengths up to 6-ft. Almost all the heavy protection stone was obtained from this source. For handling this heavy stone in those parts of the river bed where there was water to contend with berm " A " was completed first with small stone weighing from 100 to 140 pounds a piece and a temporary track was laid on this for dumping the heavy stone for berm " B." The weight of stone used for berm " A " is not of course advocated ; lack of time and labour troubles compelled the adoption of this course. It was imperative to get this section of line protected before the rainy season broke as the earthwork of the banks on this length was carried on simultaneously with the pitching. The cost of the protection only of this length amounted to $600 per chain or £72 at $8.40 to the pound. In 1923 owing to under-estimation of flood levels the pitching was topped for a short time and some slight damage done. This was repeated in the following year, the flood level exceeding that of the previous year. In this case some 1,500-ft. of bank from the point east of C in the diagram was lost. The point " C " is the danger point, currents A and B converging here setting up waves and eddies which scoured the river to such a depth that the berm provided proved inadequate and the pitching not heavy enough to resist the wave action. The railway was not however so badly damaged that temporary repairs were difficult. At this point it was decided to deviate further into solid cliff face to flatten the slopes of bank to 2 to 1 put in 4-ft. of heavy pitching and increase the berm to 30-ft. in width.

Two tunnels were found to be necessary on this length, one a short one of 383-ft. which was in very hard rock requiring no lining and calling for no particular comment, the other of a length of 3,894-ft. in a friable horizontally bedded green sandstone requiring lining to all the arch and side walls to a considerable extent. Both tunnels were driven by the top heading (Belgian) method and in the case of the longer tunnel the very great advantages (apart from its suitability on other counts) of this method in countries where expert timber men are nonexistent were very well ilustrlated. The top heading on completion was widened out to full size to admit of turning the arch for which cills were excavated to depths from 3 to 6-ft.

The arch was made of pre-cast concrete blocks, this being the only feasible way of ensuring a sound job and that the proper thickness of arch lining was put in. A further reason for the adoption of concrete blocks was the absence of suitable bricks and the certainty of proper supervision in making the blocks, these being cast outside the tunnel.

On completion of the arch the cills were under-pinned in six foot lengths. The question of sidewall thickness was a continual problem owing to the varying character of the rock. Where the rock was disintegrated into what had the appearance of a hard clay the side lining was 2-ft. thick in 1 : 3 : 6 concrete. Where the rock was rotten and showed signs of weathering badly the sidewall thickness was 1-ft. 6-in. in 1 : 4 : 8 concrete except in very wet places where 1 : 3 : 6 was used. For a length of 60 per cent. of the tunnel where the rock was sound but its weathering qualities open to doubt, pillars 18-in. thick were inserted, the rock surface between pillars being cut back to admit of a plaster of at least two inches being put in. The pillars were put at varying distances as below. They were all in 1 : 3 : 6 concrete.

Arch cill. 6-ft. below springing, pillars 6-ft. wide with 12-ft. between pillars.

Arch cill. 3-ft. below springing, pillars 6-ft. wide with 9-ft. between pillars.

Tunnel drainage in a country where 40 degrees of frost is possible and a zero temperature the usual thing from December to March was a question of some difficulty. During construction and after the tunnel was opened in November 1923 this difficulty was temporarily solved by having large matting doors at each portal which were kept closed between trains. As a tentative permanent solution of the problem a concrete, slab-covered, side drain was adopted which drained to catch pits at the North portal where pipes below the frost line were laid to a large blind well at the mouth of the approach cutting. Fortunately the amount of water in the tunnel was not at any time great, one double acting six inch Worth-

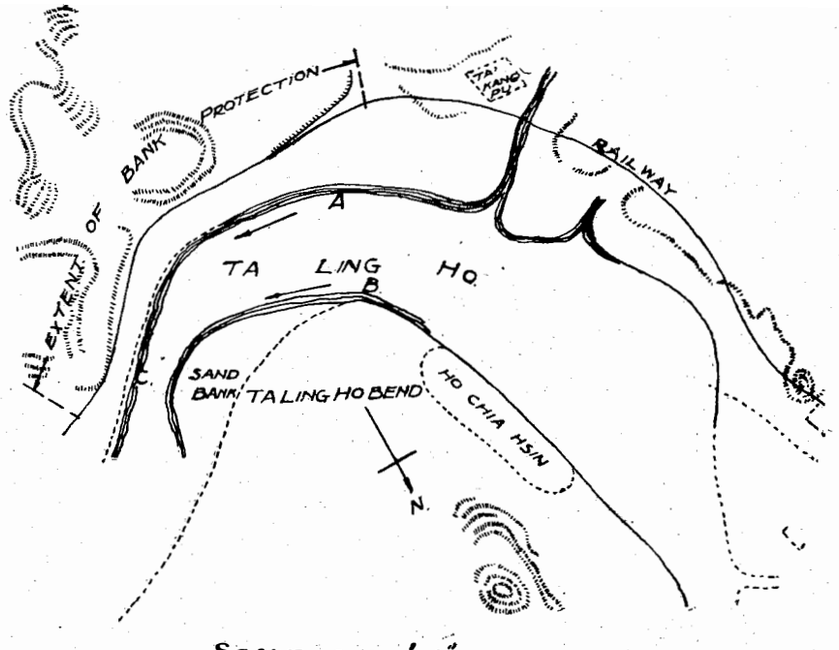


Figure 2.

ington pump in each shaft, working intermittently, amply sufficing.

The tunnels were all built for single line of the following dimensions: Arch semi-circular 8-ft. radius. Height from rail to springing of arch 14-ft. Arch thickness where lining used 1-ft. 6-in. The attached plan (Figs. 2 and 3) gives detail of lining, etc. As regards the construction scheme, the tunnel had three shafts which were served by double, steam winch-hauled, cages which handled the 18-in. decauville wagons used between the shafts. At the portals 2-ft. gauge decauville track was used. All spoil

Eight Arch Viaduct

was hand hauled to the dumps. Drilling was done entirely by hand though steam drills and steam driven fans for ventilation of headings were offered to, and refused by, the Chinese contractor. Dynamite, fuse fired, was used to a very large extent as the amount of water present precluded the use of native powder which was used for rock excavation wherever possible. Work was carried on night and day. The headings were begun in June and July 1922 and holeing through took place on February 24, 1923, the tunnel being opened for traffic on the following November 24. The size of heading

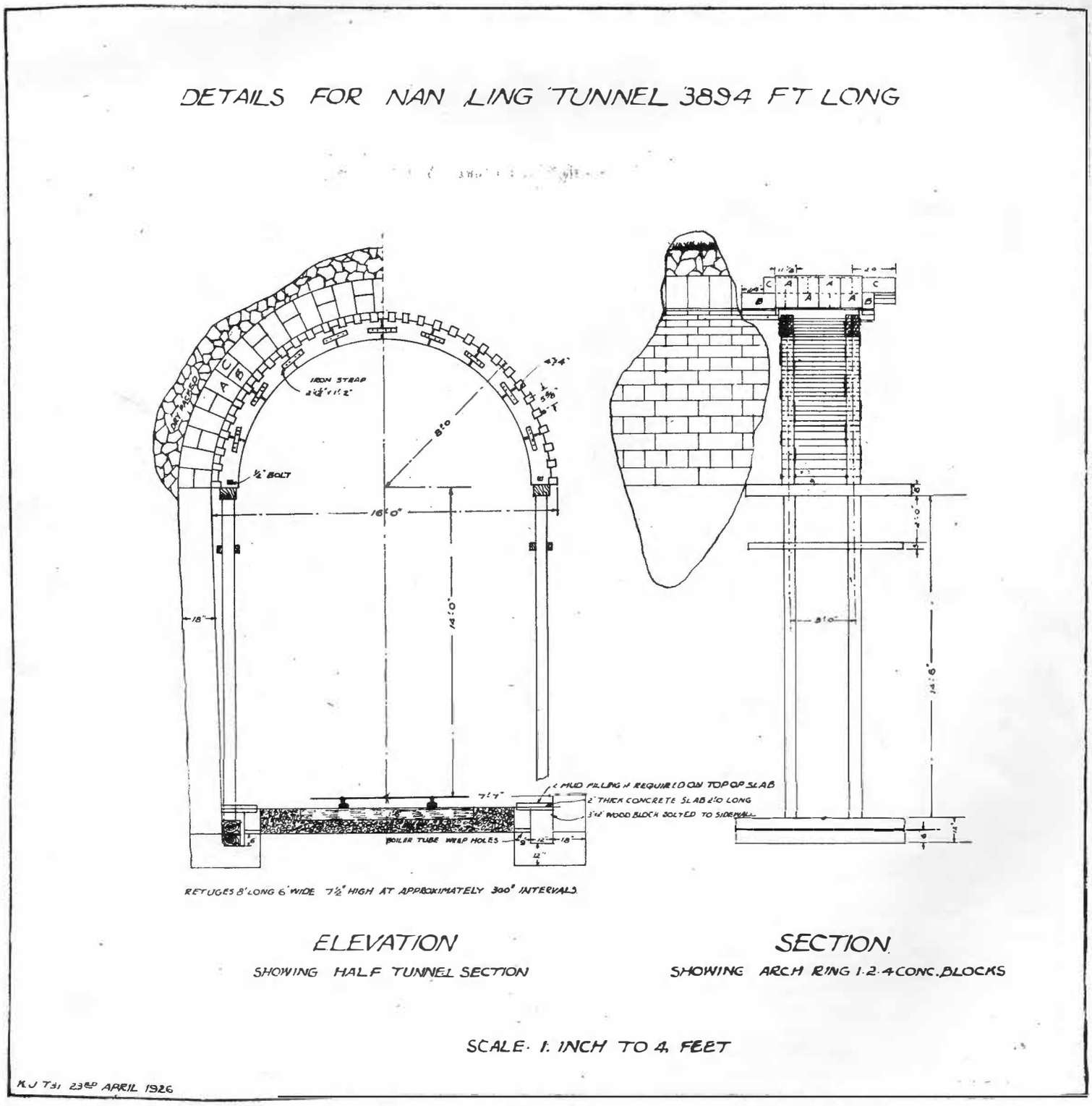


Figure 3.

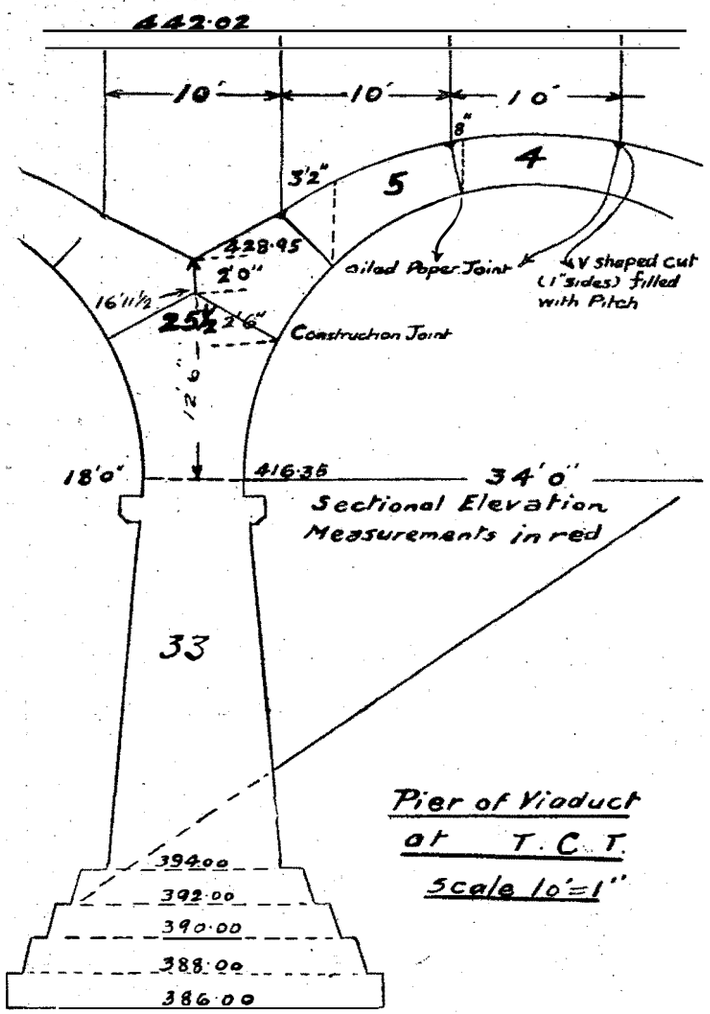


Figure 4.

first driven was about 8-ft. wide by 8 high. The only serious mishap which occurred was the bursting of a heading drain dam in the South approach cut during the torrential rain of the night of August 21, 1923. This caused the flooding of the tunnel as far as the second shaft and delayed work in this sector for a fortnight.

Data relating to the Nan Ling Tunnel of 3,894.8-*ft. length.*

Gross excavation (solid)	69,388 c. yds.
Nett excavation	61,140 ,,

Excess excavation 13.5 per cent. of which 73.6 per cent. was above springing equivalent to 1-ft. 6½-in. average depth. Below springing this amounted to 5.65-in. outside the neat line.

Average daily progress all headings ..	2.75-ft.
Maximum ,, ...	4-ft.

Explosive per solid c. yd., headings only, 1.03 lbs. of dynamite and 1.64 lbs. of native powder.

Explosives per c. yd. whole section 0.26 lbs. dynamite and 0.81 lbs. native powder.

Cost per ft. run total $129 or £15.7.0 without engineering or Head Office charges.

Cost per ft. run without lining and approach cuts $73.15 or £8.14.0.

Exclusive of the tunnels, the following is the amount of formation work done in the working season of 1923—April to mid November.

Earthwork	2,400,000 cub. yds.
Rock excavation	880,000 cub. yds.
Rock excavation in tunnels	70,000 cub. yds.

The number of men employed on this work is extremely difficult to estimate as all work was on a contract basis, but it cannot have been less then 15,000 on the 37 mile section.

Culvert and bridge work in this heavily gulched country was natnrally heavy. There were 118 culverts and 29 bridges on the 37 mile section giving a total opening per mile of 137-ft.

Arch culverts were very extensively used as headway was in most cases ample. The majority of these were in concrete and where this material was employed they were of the usual type, but all culverts over and including 8-ft. span were provided with contraction joints in the arch for which two thicknesses of a coarse tough oiled paper were used, this being pasted over the concrete surface where it was desired to form a joint.

In the neighbourhood of the coal mines a hard burnt shale brick was obtainable and this was used for all arches here in conjunction with coarsed sandstone or lime stone rubble.

Heavy calls on the railway bridge-works for renewals and double tracking also entailed the adoption of arches in plain concrete for spans of 30 and 34-ft.

The 34 foot spans were all in a viaduct of 8 arches crossing a gulley at a maximum height of 55-ft. on a three degree curve. The foundation was in hard clay which was tested up to a load of two tons per sq. ft. and loaded with a maximum load of a ton and a half in the finished structure. The arches were designed for Cooper's E 50 loading and were made 2-ft. 6-in. at the crown with 3-ft. of cover at that point. Pier thickness was 6-ft. at springing of arch and in the case of the abutments which were of the buried wing type 9-ft. at springing of arch. The general details are as in the plan attached, see Figs. 4 and 5.

There are four contraction joints per arch made as in the case of the culverts with oiled paper. The arch from springing upwards was in 1 : 2 : 4 concrete with the exception of the key block which was made in 1 : 1 : 2 concrete to admit of striking centres after seven days. The arch was only water-proofed with pitch over the joints a " V " shaped notch with 1-in. sides being cut in the concrete over these and pitch poured in. Elsewhere the arch was waterproofed with a rich mortar worked over and over till nearly set.

As regards construction details the whole of the concrete was hand mixed and in the case of the piers was carried up on inclined

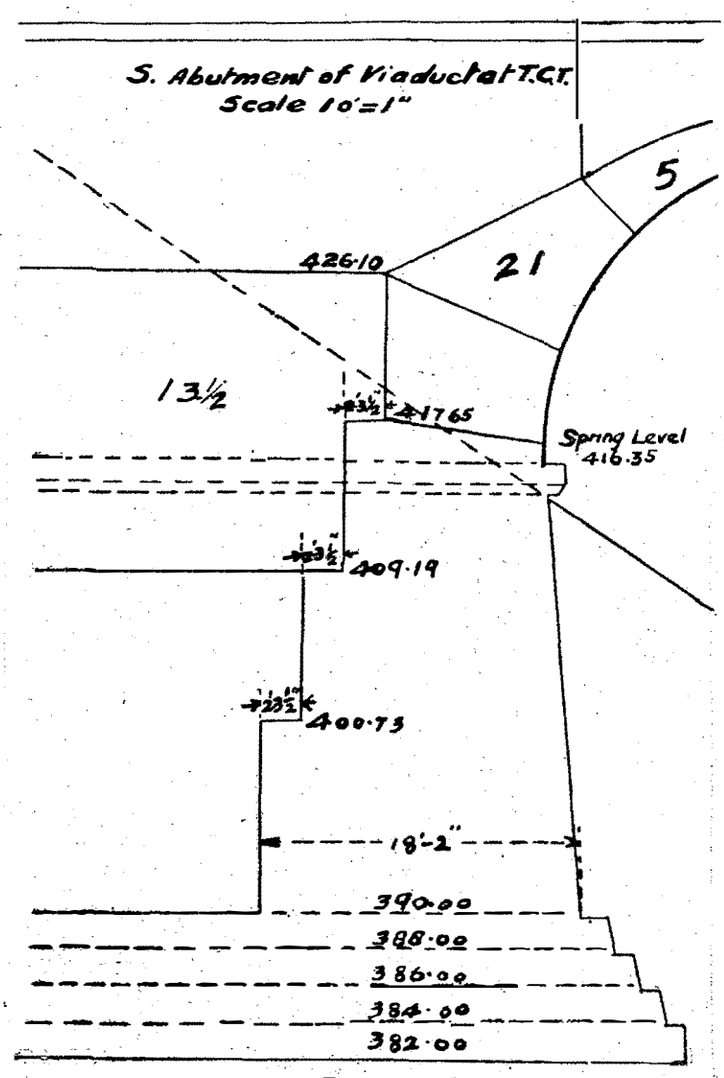


Figure 5.

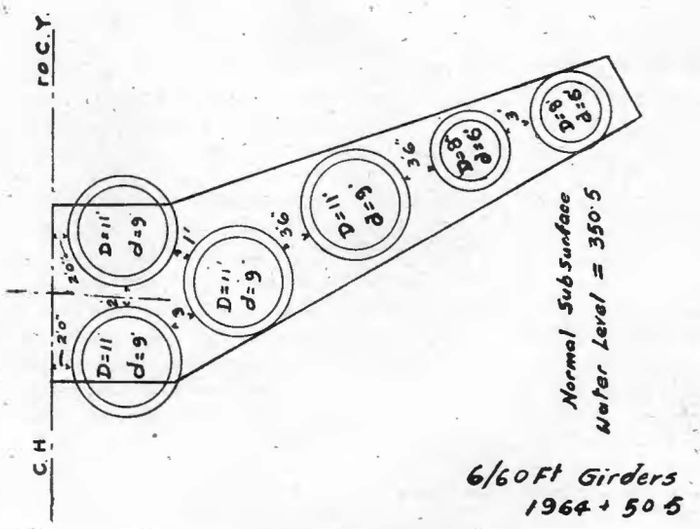


Figure 6.—Well Foundations

ways made of sleepers and planks. The arches were all cast from one end and the raw materials being carried up and mixed on platforms built over the arch haunches, these platforms being moved forward as the arches progressed. The arch centres were supported on cornices 1-ft. 10-in. thick which were re-inforced with scrap pieces of 60 pound rail at four feet centres —the spacing of the arch centres. Four sets of centres were used and no centre was struck, no matter what the age of the arch concrete, until the two arches ahead had been keyed in. The centres were supported on hard wood wedges 2-ft. in length by 8-in. wide a taper of two inches on a minimum thickness of two inches.

The following table shows the total settlement which occurred. This was only serious in the case of the South Abutment where an undiscovered soft patch in the foundation caused both vertical settlement and motion at right angles to the railway. As a consequence of this a longitudinal crack developed in one wing wall and the contraction joints opened up in the two arches closest to the settlement. This was remedied by keeping in the centres of the last two arches and pushing forward the filling to counteract the backward tilt of the abutment, the burying up of this being also expected to stop the sideways motion. Expectations were realised in this respect and the resulting opening up of the arch joints was made good by grouting. The striking of the last two sets of centres was also delayed for two months.

Air Lock, Ta Ling Ho Bridge

Total settlement of viaduct during construction.

South abutment	0.32-ft.	Pier No. 5 ..	0.02-ft.
Pier No. 1 ..	0.01	Pier No. 6 ..	0.01
Pier No. 2 ..	0.06	Pier No. 7 ..	0.01
Pier No. 3 ..	0.03	North abutment	0.06
Pier No. 4 ..	0.03		

The structure contained about 7,000 cub. yds. of concrete, 6,900 drums of cement being used, concrete being proportioned as follows:

In foundations and plinths 1 : 4 : 8. In piers, spandrels and copings 1 : 3 : 6. In arch as previously stated mainly 1 : 2 : 4.

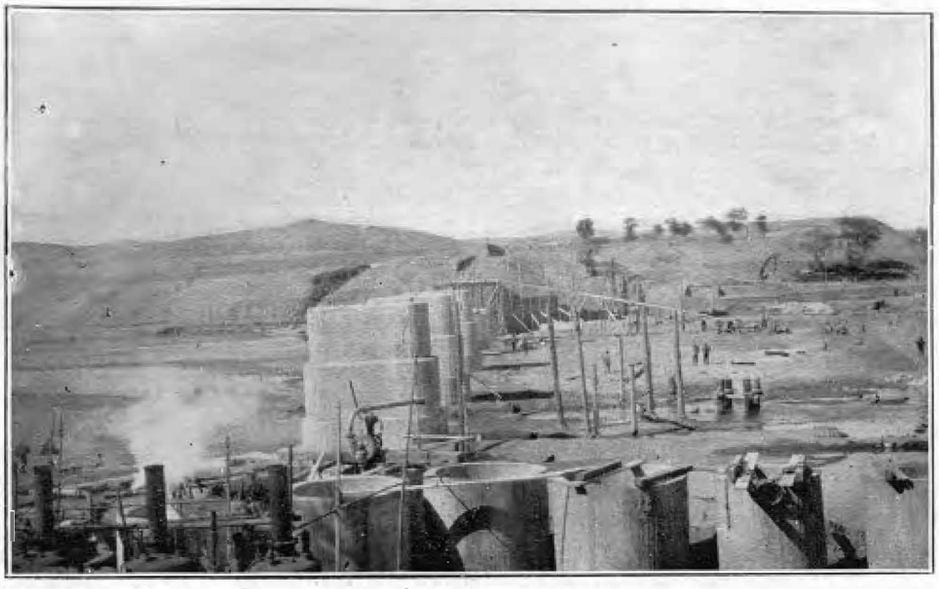
Concreting of the foundations began on March 31, 1923, the piers and abutments to springing were completed on June 5. The first arch was keyed on June 18, the last on July 29, and the viaduct was opened for traffic on October 5. Up to springing level the placing of the concrete was done by contract, above that point the work was done entirely by day labour, about 140 concrete coolies and twenty carpenters being employed continuously. The time taken for casting an arch was 3½ days. The casting of concrete was carried on without interruption between joints of arch. The cost of the structure was $199 (£23.14.0) per foot of arch opening.

In the case of the 30 foot arches the same procedure was adopted, but in this case the centres were either supported on sleeper stacks where there was not much risk of flood, or in doubtful localities, by single tiers of sleepers which rested on the footings and were secured by walings bolted through bolt holes used in the casting of the structure below springing.

The general plan details were exactly as for the 34 foot arches. For the foundation however wells were very largely employed as the streams crossed were full of boulders and quite unsuitable for piling. Most of these streams were dry during the winter and early spring and it was found possible in all these cases to get the wells down to a safe foundation using four inch barge pumps only; as many as four per well being employed in porous ground at shallow depths and at the greater depths in clay where such sinking was carried to a maximum depth of 22-ft. These wells were arranged as in the plan (Fig. 6), but in general two sizes of wells were used for all cases, 9-ft. internal diameter under the piers and a combination of 9-ft. and 6-ft. wells under the abutments (see Figs. 7 and 8). These wells were all in 1 : 2 : 4 plain concrete with a shell one foot thick the bottom 3-ft. being widened out to 1-ft. 3-in. thick with a 45 degree cutting edge at the bottom. The lifts put on, as sinking proceeded, varied from 3 to 9-ft. No trouble at all was experienced from excessive leakage or cracking. On reaching a satisfactory bottom the wells were sealed off under water with a two foot thickness of 1 : 2 : 4 concrete. When this had set the well was baled out and the well filled to footing level with 1 : 4 : 8 concrete.

Wells were also adopted in three cases where water was flowing freely on the surface to a maximum depth of about two feet under low water conditions. The river-beds in two cases were composed of gravel and sand in alternate layers mixed with large boulders overlaying a rock bed of hard basalt at a depth of about 13-ft. in one case 15 feet the other. In the last case the river bed was sand as far as hand boring tackle was able to go and in this case it was considered that with the opening provided seventeen feet of sinking would place the found ations out of all reach of scour.

In the above cases it was of course necessary to use steam pumps for unwatering, and for this purpose the direct driven six inch centrifugal pump was found to be the most satisfactory on



Well Foundations in Fore Ground

account of its lightness. These pumps were mounted on two twelve by twelve baulks bolted together, these timbers being of sufficient length to span the wells. They were connected to the main steam pipes through a fifteen foot length of flexible inch and a half copper corrugated tubing, which was always, except when quite new, responsible for a very high steam leakage. Two such pumps were always found sufficient to cope with the water. These pumps had a 6-in. cylinder by a six inch stroke and were run at about 500 revolutions. Considering the rough handling they came in for, especially under winter conditions of work they gave astonishingly little trouble. For winter work in Manchuria these pumps should be fitted with drain cocks to avoid damage to casings as happened in one instance when the pump was not drained after stopping work.

On reaching rock the rotten surface was cleaned and a sump cut in the middle of the well for the pumps. A circular wooden drum 4-ft. 6-in. diameter by 2-ft. 0-in. high was then sunk in the middle of the well and a concrete sealing layer for the edge of the well placed under water between the well shell and the outer surface of the drum. This concrete was 1 : 1 : 2 mixture. This sealing layer in some cases would be tight enough to admit of baling out the well and cutting out a clean key of rock 4-ft. 6-in. diameter in the centre of the well, in other cases it would be necessary to put back one centrifugal pump for cutting this key. The key was then sealed with concrete under water and the well filled with 1 : 4 : 8 concrete to footing level.

Pier wells were tied together with a heavy rail re-inforced footing 4-ft. thick. Where it was not possible to sink this with sheeting or horizontal planking in the usual way a rectangular concrete caisson was used for these small depths of about 5-ft. This was made 1 foot thick and re-inforced with cement drum strips 4-in. wide, or better with bamboo. These footing caissons were 34-ft. long by 18-ft. 6-in. wide and they were stiffened centrally by two short beams at the top and bottom of the caisson, these beams being 12-in. square in section.

On the pier wells for 100 foot spans the total pier foundation—two 9-ft. diameter wells—provided was 192 s. ft. giving a foundation pressure without any skin friction of 3 tons per sq. ft. approximately. Cost of well sinking was about $22 or £2.13.0 per cub. yd. displaced.

Considerable use was also made of concrete pipes of two and three feet diameter for drainage areas up to 14 acres. These had a re-inforcement of telegraph wire and were 3½-in. and 4-in. thick of 1 : 2 : 4 concrete cast in 3 and 6-ft. lengths. Where these pipes were used in banks under 10-ft. in height they were backed with rubble masonry 18-in. thick for the middle 10-ft. and where banks were higher than this the backing was extended to 20-ft. in length.

One experimental 48-in. concrete pipe was tried. This was re-inforced with rigns of ¼-in. sq. iron at 3-in. centres and ¼-in. longitudinal bars spaced 8-in. centres. The pipe was cast 4-in. thick in lengths of 8-ft. and proved quite a satisfactory job.

Concrete pipe gave uniform satisfaction and as compared with the small concrete culvert were infinitely quicker and at the same time cheaper. Only double pipes were allowed. Pipes and culverts were contoured wherever this was found feasible in order to save length, a heavy rubble drain being inserted at the lowest part of the bank to cope with the resulting undrained pocket.

All sand for concrete was tested for tensile strength, the strength of the mortar used in all tests being 3 to 1 and the age at testing 7 days. One hundred pounds per sq. inch at this age was considered safe enough for the very low stresses prevailing in mass concrete. In re-inforced concrete work sand was specially selected.

The biggest bridge on the extension was that crossing the Ta Ling Ho at Mile 59. This crosses the river at a height of 32-ft. above low water, low water at a maximum being about 4-ft. in depth. The river bed was 3,300-ft. wide at this crossing and it was decided to bridge this with sixteen 100-ft. spans. The normal unrestricted flood level in the river was some 12 feet over low water level.

With the exception of the wings of the well sheltered south abutment all the foundations were placed on steel caissons which were sunk by compressed air. These caissons were elliptical in shape with a base area of 228 sq. ft. and a working chamber height of seven feet in which six men could work with comfort. Their weight was about 9 tons unfilled the skin filling being of 1 : 2 : 4 concrete.

Borings indicated that a layer of silt and sand of varying coarseness overlay a thick bed of very hard clay. The caissons were sunk into this clay to a depth of about 10-ft. in all cases.

The plant and the general method of construction employed were designed by Mr. C. W. Kinder, C.M.G. and have been described previously by Messrs. Rigby and Leitch in the Proceedings of the Institution of Civil Engineers, Vol. 160, 1904-5. Four tandem horizontal 12-in. by 12-in. by 24-in. air compressors working at 75 r.p.m. were used for which ten, 10 horsepower, boilers plus two spares were required. The compressors were placed in two 40-ft. by 40-ft. engine houses directly opposite piers six and twelve. These engine houses were built of two inch plank, covered inside with straw matting and also papered at the joints, this precaution being taken to limit as much as possible the admission of the very fine silt which formed the river bed top surface, and which the slightest breeze raised in clouds while the wind storms prevalent in winter masked the whole countryside in impenetrable red-brown fog. For the same reason the air intake of the compressors was placed inside the engine houses and this had the disadvantage of causing the occasional freezing up of the air intake tees to the air locks ; a preferable choice of evils however compared with damaged compressors. Ten of the standard air locks with five separate winch boilers were employed. The main 2½-in. air line running parallel to the bridge axis was from 15 to 20-ft. from the bridge centre, the connection to the air locks off this being made with armoured rubber hose. Pressures during construction never exceeded 20 lbs. per sq. inch and not more than three caissons were under air at any one time.

Railway traffic for, and north of the bridge, was carried across the river on a temporary bridge of forty two twelve foot spans on pile trestles built 100-ft. down stream from the permanent centre line. The engine house boiler annexes abutted on this bridge so that coal was shot down almost in front of the boilers whose centres were fixed at about 16-ft. from the nearest rail.

The construction scheme aimed at getting all the sinking in the low water channel of the river—about 500-ft.—done during the winter when this was frozen to a depth of at least two feet, capable of sustaining with ease the weight of an air lock—about 4 tons. Here the caissons were unloaded on to the ice and hauled over to the pier sites where they were erected on previously prepared islands built of a rubble shell with a heart of small ballast and mud. They were sunk empty to water level when they were filled with concrete to two feet above the top of the working chamber preparatory to air-sinking. The caissons above low water were erected in holes dug down to the ice level. The first lift of concrete was as stated above—two feet over working chamber top—thereafter the lifts were 8-ft. The normal rate of sinking in sand or coarse gravel without boulders of such a size as to necessitate the use of the man lock, was 8-ft. in the 24 hours. In the hard clay this fell to 1-ft. 6-in. in the same interval.

All the air work was carried out without incident of moment, the only serious difficulty encountered being the jamming of the most of the caissons after penetrating about 5-ft. into the clay. This may have been due to "swell" of the clay. This difficulty was overcome in the usual way by weighting the caissons with about 30 tons of rails and then removing the air pressure as rapidly as possible. This caused delay to the sinking programme which was further accentuated by a most unusually warm spell in February which caused the river to burst through the ice above the bridge and flow over the frozen surface for about a week, after which cold weather again supervened. The engines and air receivers in the engine house which was in the channel were placed on a wooden base which rested on piles and the air line in the channel was also pile supported. This turned out to be a very necessary precaution as owing to delay in sinking this engine house was exposed to the heavy scour due to the freshet resulting from the break up of the ice in March.

Protection work for the major bridges was a heavy item. In the case of a big bridge as above where opening was restricted, the approach banks were pitched to two feet above the expected new flood level and a berm of heavy stone provided as in the case of the river protection work previously described. The berm of heavy stone was not so wide as in the case cited, being 25-ft. in the case of the Ta Ling Ho Bridge and 12 in the smaller bridges where river conditions were not so severe. Further in the case of all bigger bridges up stream and down stream training banks were provided to throw the eddies resulting from conflicating currents away from the abutment. Up stream training banks were made at least a span and a half in length down stream a minimum of 50-ft. These were carried about 5-ft. above expected flood, built of first class material heavily pitched and provided with an apron of heavy stone—5-ft. thick. All culverts were also provided with an apron

of heavy stone at least 10-ft. in length below where the invert ceased; the down stream apron having specially heavy stone. Top width of training banks was a minimum of 10-ft. and slopes 1½ to 1.

Through track-laying began on October 7 from mile 39 and was pushed on without a break till mile 67 was reached on January 16. Six stations were laid in and seven deviations with temporary bridges. The track is a 60-ft. rail, 30-ft. long, laid on Oregon sleepers, fourteen to the rail.

The station lay-out for passing stations is as usual for single tracks, up and down loops protected by locking bars and detected with the signals being provided. The signalling consists of an eight lever frame fixed centrally which works all the signals—up and down homes and distants and starting signals. In addition, catch sidings are provided in the case of those stations where it is possible for a train to overrun. All Points are hand worked. At Nan Ling station where the signal would have been inside the tunnel, this is placed at the North Portal and operated by electric motors from the cabin. Webb and Thompson's electric staff is used for train control.

It should be stated here that with the exception of the work on the Ta Ling Ho Bridge the work described here was of necessity almost entirely completed ahead of rails. All plant for the tunnel and all cement for those structures considered vital was handled by native carts over the unmetalled roads of the country. The disturbances resulting from the civil war of the autumn of 1922 caused great delay to the preliminaries of construction and recruiting in the spring and summer of 1923 when construction was in full swing was responsible for a serious labor shortage at a most critical period.

The staff employed on the work at various periods was as below:—

Preliminary surveys and reconnaissances ..	Mr. J. C. Steen
March 1921—October 1922, Resident Engineer in charge of Tunnel at Nan Ling and surveys Mile 32 to Mile 59	Mr. H. Farrant, A.M.I.C.E.
Assistant Engineer in charge of Tunnels and Ta Ling Ho Bridge from June 1921 ..	Mr. B. L. Jacobs
Resident Engineer in charge October 1922 to April 1924	H. Stringer
Assistant Engineers during this period ..	Messrs. A. H. Douglas, A.M.I.C.E., B. L. Jacobs, K. S. Wang, 8 cadet engineers, 2 student engineers.

The work was under the general supervision of Mr. W. O. Leitch, M.I.C.E., Senior District Engineer and was carried out under the direction of Mr. L. J. Newmarch, M.I.C.E., General Manager and Engineer-in-Chief of the Peking-Mukden Railway to whom I am indebted for permission to make use of the plans from which the diagrams in this article have been prepared.

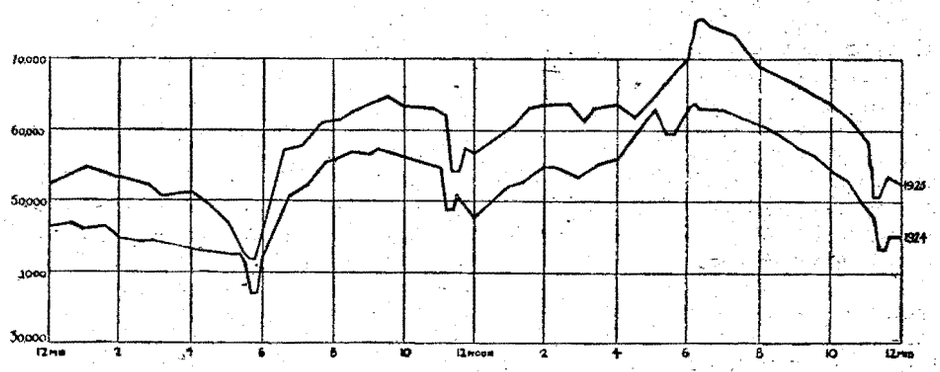
Throughout this article the rate of exchange from dollars to sterling has been taken at $8.40.

The Chinese cubic measure of 1 fang—110 cub. ft.—has been converted to cubic yards at the rate of 4 yds. to the fang.

The line being still in an incomplete condition it is not possible to give costs with any certainty but an indication of the probable cost is given by that of an almost completed section of 12 miles from Mile 33 to Mile 45. This worked out at $77,839 per mile or £9,250 approximately without engineering or Head Office charges.

The Shanghai Load Curve

A VERY interesting load curve covering the 24 hours of Tuesday, December 30th, 1924, and Tuesday, December 29th, 1925 is herewith reproduced. The magnitude of the industrial load can be gauged from the fact that neither the lighting nor the domestic heating load (the latter being estimated at about 4,000 kw.) super-imposes any serious peak on a fairly flat power demand. It is a testimonial to unified control that the output of this Central Station in the Far East is greater than that of all the London Municipalities put together and possibly greater than that of all the Metropolitan Companies put together.



Vertical figures on the left in kilowatts.

Five New Steamers for Netherlands East Indies Trade

The increasing coastal trade around the Netherlands East Indies has resulted in the Koninklijke Paketvart Maatschappiji of Amsterdam placing orders for the construction of five new steamers, of about 2,000 tons each, with accommodation for a limited number of passengers, to be used in the coasting trade of the Netherlands East Indies. The building of the vessels is divided among several Dutch firms. One of the ships, with machinery, is to be built by the Rotterdam Drydock Company, which has thereby secured employment for its last vacant berth. The hills for the other four vessels are to be built by the Internationale Scheepsbouw Maatschappij de Maas, Slikkerveer, the machinery installations for the latter having been ordered from the Fijenoord Shipbuilding and Engineering Company.

The "Metrovick" 20,000 kw. Turbo-Alternator, erection nearing completion at Shanghai

Jessie A. Chieri

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

UPLIFT OR TRADE

By George Bronson Rea

THE NEXT WAR

JAPAN'S POLICY TOWARDS CHINA

HOW RUSSIA BLOCKED AMERICAN DIPLOMACY IN MANCHURIA

THE BRITISH STRIKE

THE PENDULUM SWINGS

MR. STRAWN COMES TO CHINA

CHINESE EASTERN RAILWAY

DEVELOPMENT AND CHARACTER OF JAPANESE BUSINESS

Vol. XXII June, 1926 No. 6

SHANGHAI, PEKING, TOKYO AND MANILA

The Chinese Eastern Railway

By Dr. C. C. Wang

THE Chinese Eastern Railway was primarily the cause of the Russo-Japanese War, and was instrumental in bringing about the Russian Revolution. Ever since its conception in 1896, it has been constantly creating suspicion among the Great Powers and keeping all concerned in a state of anxiety. With a length of only 1067 miles and an average gross earning of about 30 million dollars per annum, the Chinese Eastern Railway has certainly acquired more notoriety than any other railway of its length.

First of all, it may be asked, why such a small railroad as the Chinese Eastern should have created so much mischief and attracted so much attention. The foremost reason seems to be the existence of extraterritoriality in China. On account of extraterritorial privileges, China could not exercise any jurisdiction over foreign citizens or foreign firms in China. Consequently, the Chinese Eastern Railway Company—a stock company originally registered under Russian law—and its Russian employes, together with the large number of other Russians who came with the railway, carried with them Russian jurisdiction and Russian police everywhere they went. Thus the whole zone traversed by this system, including the South Manchuria Railway, was alienated and virtually transformed into Russian territory. Not only all foreigners, including all sorts of adventurers, opium-smugglers, and other bad characters within this long zone were free from Chinese law and Chinese jurisdiction, but even Chinese bandits, anarchists, criminals, etc., were at once beyond the reach of Chinese law the moment they managed to escape into this long zone or into any of the numerous towns within this zone. This fact, together with the abusive use made of the Chinese Eastern Railway for colonization and exploitation purposes, which we shall examine further, seriously jeopardized China's integrity.

Dr. Chin Chun Wang, C.E., Ph. D., LLD.
President and Director General of the Chinese Eastern Railway.

A comparison may help to make this situation clear. If we imagine that the Boston and Maine and the New York, New Haven, and Hartford railroads were a Russian corporation and that these railroads and all their employes, together with all other foreigners along the railroad, etc., were under Russian law with Russian courts and police (the number of such police being increased as Russia saw fit) and that all sorts of bandits, bootleggers, etc., within the railroad zone would be free from American jurisdiction, we could see what would be the effect upon the states traversed by these railroads and what would be the repercussion of such a state of affairs upon Washington. And this was exactly the state of affairs in the Three Eastern Provinces (Manchuria) until 1924, when Russia's extraterritorial rights were cancelled.

The second reason seems to be geographical. A glance at any map will show that China, like her homes and her cities, is "walled in" on all sides by immense barriers. On the east and south is the China Sea; on the west and southwest we have the Yunnan and Tibet mountains; on the north we have the Mongolia deserts; while the Three Eastern Provinces with their deserts and mountain ranges serve as a "helmet" to China's capital. Thus "walled in" and protected from her neighbors, China's political and economic systems have been accordingly developed through the past centuries. Once the Chinese Eastern Railway was built, it immediately broke the barrier between China and the West. Her "helmet" was pierced. Europe was brought to Peking within seven days. Such a penetration as that made by the Chinese Eastern must have had an effect upon China no less immediate and far-reaching than the penetration made by the steamship through the seas, as shown by the fact that, following the construction of the Chinese Eastern, China's foreign relations became far more important and complicated in the northeast, where there had never been much difficulty, than in other directions. A cursory review of China's foreign relations since 1896 will at once bear this out.

The Three Eastern Provinces, through which the Chinese Eastern runs, have an area equal to that of Germany and France combined, rich in forests, mines and fertile land, with a poopulation of over fifteen millions. So long as they were left alone, Peking felt safe. Potentially and strategically, the Three Eastern Provinces are so situated that any predominating foreign influence there would have an immediate repercussion upon Peking, because they are so vast, so rich, and so near. The seizure by a foreign power of such an important province as Canton or Fukien would perhaps have less effect upon Peking than a similar catastrophe in the Three Eastern Provinces. Therefore, what happens there not only constantly causes alarm in all China, but also creates uneasiness among those powers whose belief and interest it is to preserve China's integrity.

But a railroad itself, as understood here in America, could never have done so much mischief and caused so much concern as the Chinese Eastern. Besides the two former reasons, it is largely the abusive use of the railroad as a means of exploitation and conquest that has made the Chinese Eastern notorious. As in the past, when disasters associated with the railway were either due to the defects of the agreements concerning the railway, or were the result of improper interpretation or abuse of these agreements, so in the future either the phraseology of the railway's existing agreements or any improper execution or abuse of them may yet lead to further difficulties. We shall, therefore, endeavor to examine, briefly, the origin and the principal vicissitudes of this railroad, as well as its agreements in so far as they have had any immediate bearings upon international relations.

Russian Activities in the Far East

The late Tzar Nicholas, upon his ascension to the throne, was anxious to spread Russia's influence in the Far East. With this in view, the gigantic scheme of the Trans-Siberia Railway was carried out with amazing vigor and speed. A few years from its conception, the whole railway, with a total length of more than 5000 miles over the vast territory of unknown Siberia, was pushed through to Vladivostok. As the left bank of the Amur River is Chinese territory, the railroad had to be built along the right bank of the river, thus describing a big semi-circle from Chita to its eastern terminus. The idea soon came to the mind of the Tzar and his ministers that if the road could be carried from Chita directly southeast to the sea through Chinese territory, the distance between Vladivostok and St. Petersburg could be reduced by about 500 miles. Moreover, the operating and maintenance difficulties due to climatic and other conditions of the country would be greatly reduced. No time was lost in carrying out this idea.

In 1896 Li-Hung-Chang was sent by China as Special Envoy to St. Petersburg in connection with the Tzar's coronation. Soon after his arrival in Russia, he was approached on the subject of the proposed short cut. Naturally Li hesitated to agree. The Russian authorities emphatically emphasized that the scheme was only for reducing the distance and the operating difficulties of the Trans-

Siberia Railway and that the line should be exclusively devoted to commercial and cultural purposes. It was not until much pressure was brought to bear upon him, even to the extent of making him understand that it was the Tzar's own wish, that Li agreed to grant the concession. At first Russia wanted the railorad to be constructed and owned by the government, and it was due to Li's determined objection that a private corporation, called the Chinese Eastern Railway Company, was organized specially for the purpose.

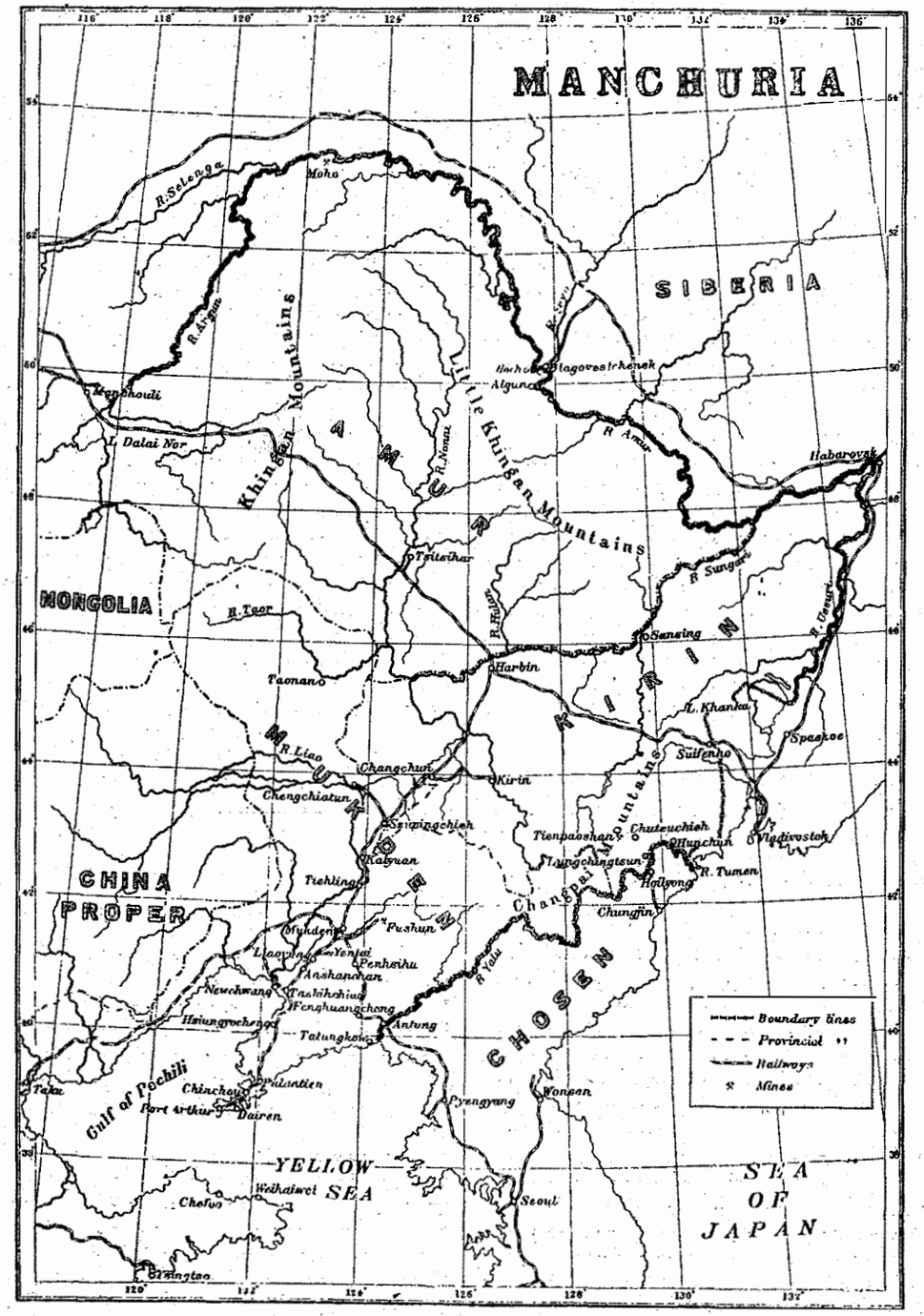
As a preliminary step, the Russo-Chinese Bank was organized, in which China invested five million taels, or about $4,000,000 gold at that time, as her share of capital. An agreement consisting of five articles along general commercial lines was adopted, specifying that China should share in the management, as well as the profit and loss, of the bank's business in proportion to her share of capital.

The Fateful Concessions

In turn, another agreement was signed between China and the Russo-Chinese Bank, by which China granted to the bank the concession for the construction and operation of the Chinese Eastern Railway, which connects the Trans-Siberia Railway at Manchuli on the west and links up with the Oussuri Railway on the east. The bank was made the *entrepreneur*, or undertaking company, which was sometimes found in early English practice.

Again, in this agreement with the bank, it was provided that a separate stock company should be organized for the construction and operation of the railway, which should be called the Chinese Eastern Railway Company. This stock company should

(1) issue its own shares to the extent of five million roubles ;
(2) the president of the Company should be Chinese ;
(3) the seal of the company, which is the sign of authority, should be issued by the Chinese Government ;
(4) China should be responsible for the protection of the employes of the railway ;
(5) all government land required by the railway should be granted free to the company ;
(6) all materials for construction should be free from duty and all railway land should be free of tax ;
(7) Russian troops might be transported through Chinese territory by the railway, but such troops should not stop over en route.



The agreement further provided

(1) that the shareholders of the company should be Chinese and Russians only ;
(2) that on the expiration of eighty years from the commencement of traffic the whole railway should revert, without payment, to the Chinese Government ;
(3) that China should have the right, at the expiration of thirty-six years from the date of operation, to redeem the railway on the payment of the actual cost of the railway, together with all the debts incurred therefrom ;
(4) that all surplus of the railway, minus the percentage paid to shareholders, should be deducted from the cost of the line, to be ultimately paid by China for redemption ;
(5) and that upon completion of the line, the company should pay the Chinese Government five million taels.*

Thus, summarizing the above, it will be seen that the following steps were taken :

(1) the organization of the Russo-Chinese Bank, of which China was a principal shareholder ;
(2) the agreement between China and the bank governing the concession of construction and operation of the railroad ; and
(3) the formation of the Chinese Eastern Railway Company, which was to take over from the bank the concession granted by China.

It would appear at once that the whole arrangement suggested a series of wheels within wheels.

The terms of the concession granted by China were considered by St. Petersburg as very favorable to Russia. China at the time only cherished the pious hope that the peaceful spirit of the agreement, as repeatedly asserted by the Russian authorities, would guide the execution of the agreement.

An analysis of the agreement will show that for an enterprise of such importance there is much lack of clearness in the text. Yet, ambiguous as it was, there was ample room for co-operation along commercial lines for the benefit of both. Unfortunately, advantage seems to have been taken from this lack of clearness in the agreement to make things even less palatable to China. While the agreement provided that the shares of the Chinese Eastern Railway Company should be bought only by Chinese and Russians, the issue of the shares was handled in such a way that no Chinese

*This amount has never been paid in spite of repeated representations made by the Chinese Government from time to time.

was permitted to enjoy this provision. As a matter of fact, it was said that the shares were opened for sale at one o'clock on a certain Saturday in St. Petersburg and closed at five minutes past one after the announcement of the sale. The agreement says that the surplus of the company, after what may be divided among shareholders as dividends, should be applied to the redemption of the road in China's behalf; but it does not say to what extent the surplus may be divided as dividends. As the total share capital is only five million roubles, and as a railway of such length and importance as the Chinese Eastern may, under proper management, earn a surplus equal to two or three times the amount of the total share capital, the question of division might develop into an important question as the surplus of the railway grew. It is understood that this point was raised in 1920, and that by an exchange of letters between the representatives of the shareholders and the Chinese Government a certain scale was agreed to, whereby certain proportions of the surplus were to be divided as dividends and certain proportions should be applied to the redemption fund in behalf of China.

Russia's Breach of Faith

Construction of the Chinese Eastern was begun in 1897 and was pushed with unusual speed. In the meantime a new phase of Russia's scheme was introduced. In March, 1898, that is about one year and a half after the signing of the original agreement, Russia secured under duress from China the lease of Liaotung Peninsula for thirty-six years, as well as the right to construct a branch line from Harbin, a central point on the Chinese Eastern, directly southward to Ta-Lien-Wan (Dairen), with the proviso that the agreement of 1896 between China and the Russo-Chinese Bank should apply with equal force to this branch line. This step, as was acknowledged by Count Witte, who originally negotiated the Chinese Eastern Agreement, was diametrically contrary to the understanding given in 1896, when Russia definitely assured Li that the Chinese Eastern would not go southward from a straight line connecting Chita and Vladivostok. It was understood that there was much opposition in Russia to this breach of good faith with China. But the jingoistic elements had their way. The Russians themselves, to use Count Witte's words, "broke the agreement and brought about the situation from which they suffered humiliation and disgrace."* The original agreement of 1896, one-sided as it was, was not bad enough to expose Russia's naked designs in the Far East, had she made any attempt to honor it. It was the scarpping of that agreement, which was dictated on her own terms, that led to her expansion southward where she, within the period of five years, met her humiliation.

Another dangerous step was the introduction of Russian civil and military administration along the railway. Large areas of land, which were obtained at numerous places under the pretext of being required by the railway, were set aside and mapped out for cities, towns and villages for the settlement of Russian immigrants. These municipalities were all governed by Russian administration, and were under Russian law and police. Thus the whole zone penetrated by the railway was made into a Russian colony, and China's integrity violated.

In 1900 the Boxer uprising gave a further excuse to Russia for extending her imperialistic designs. Taking as a pretext the suppression of the Boxers, Russia sent a large army to occupy the Three Eastern Provinces. At the outset, the whole Chinese population of Blagovieschensk, a Chinese settlement on the right bank of the Amur, of about 5000 men, women and children, were driven into the Amur at the point of the bayonet. In consequence, the Three Eastern Provinces were soon over-run by Russian troops. Proclamations were posted by Russian commanders which amounted to declarations of conquest. As a Russian engineer of the Chinese Eastern then wrote: "Punitive expeditions were made with no other end in view than to furnish an excuse for new promotion and new looting." Peking being occupied by foreign troops, the Chinese Government was helpless.

I may be permitted to digress here by remarking that these brutalities have not been forgotten by the Chinese. When the Russian Government collapsed in 1918, and the Russians along the Chinese Eastern were helpless, there was considerable talk among certain quarters of the Chinese people to retaliate the Blagovieschensk atrocity by driving an equal number of Russians into the Amur. It was forgiveness and not forgetfulness that prevented such a retaliation. As a matter of fact, the leading authorities made it a special point to protect, with equal vigor, the Russians of all parties and all "colors," believing that two big neighbors like China and Russia, with a contiguous frontier of some four thousand miles, cannot live happily by returning a tooth for a tooth and an eye for an eye. Inspite of the Chinese authorities' shortcomings, which were many, in their handling of the Russians during these trying years since 1918, one thing I can vouch for, and that is that generally speaking they tried to treat the Russians fairly and with sympathy during their days of distress. Relief measures were adopted by the authorities, in spite of their own financial and other difficulties; and the absence of any serious conflicts between the Chinese and Russians during these years constitutes some of the results.

Russia occupied the Three Eastern Provinces ostensibly for the purpose of helping Peking to quell the Boxers. The Boxer disturbance soon ended, but the Russian troops continued to remain. The result was widespread distrust on the part of China, jealousy and malevolence in Europe and alarm in Japan. The Chinese Eastern and its southern branch were pushed through just in time to witness the Russo-Japanese War, which was declared in 1903.

Japanese Activities in China

What happened afterwards must be fresh in the minds of all. Russia was defeated with no small credit due the local Chinese, who helped in numerous ways. By the terms of the Portsmouth Treaty it was arranged that, subject to China's consent, Japan should take over the southern branch of the Chinese Eastern Railway up to Chang-Chun, a point approximately half way between Mukden and Harbin, together with all right connected therewith. In December of the same year, Japan secured China's consent to the Russo-Japanese arrangements, with the further right of constructing a branch line from Mukden to Antung, a point near the western border of Korea. The Mukden-Antung line was to be operated by Japan for a period of eighteen years, beginning December 22, 1905, and on the expiration of this date China had the right to redeem it at a price to be settled by arbitration. By the famous twenty-one demands, which Japan made upon China in 1915, China has up to now been prevented from exercising this option, although she reminds Japan of it repeatedly.

Construction and Management

A word about the construction and cost of the railway may be of interest. With the exception of the tunnel under the Hingan Mountains and the bridge over the Sungari at Harbin, the Chinese Eastern runs through very easy and flat country. The bridges and tunnels were well built from an engineering point of view. But the question of economy, as shown by the accounts of the railway, did not seem to have entered into the minds of the railway authorities. On the contrary, there seems to be much evidence to fortify the impression that unnecessary lavishness in the spending of money was generally encouraged. Enormous sums were spent for the erecting of magnificent residences, numerous barracks, palacial club-houses, magnificent churches and schools, etc., all with the idea of inducing Russians to settle along the Chinese Eastern. All these expenditures were charged to the accounts of the railway, thus swelling the cost of construction to something like 400,000,000 roubles, or about $200,000 gold per mile!

A comparison of this figure with the average cost of $63,000 per mile for the Chinese Government Railways may be illuminating, in view of the fact that, on the whole, the construction and engineering features of the Chinese Eastern were not more difficult than those of the Chinese Government Railways. As the latter were constructed by foreign engineers with imported materials and borrowed money, and with a consequent expenditure considerably higher than under ordinary circumstances, this high cost of the Chinese Eastern will at once appear significant. Extravagance and other irregularities were said to be responsible for this abnormally high cost of construction.

Space will not permit any detailed study of Russia's use of the Chinese Eastern during the years 1905-17. Suffice it to say that since the Portsmouth Treaty Russia has exerted every effort to

*Memoirs of Count Witte. 1920.

consolidate her position in north Manchuria by colonization and other methods. It was said that Russia intended to make Manchuria a second Bokhara. The Chinese Eastern Administrative departments were made the headquarters of all civil, military, political and religious activities of the whole colonization scheme. A cursory analysis of the organization of the Chinese Eastern Railway Administration and its budget of those years will show at once the unusual character of that railway in those days.

First of all there was what was called the Civil Administration Department, which took charge of the local land taxes, as well as taxes on wine, tobacco, etc. Besides other activities this Department had supervision over the police, the law courts, and the municipal councils of towns. Churches and schools of all grades were also under this Department. About one million roubles was expended annually for the churches and schools. At times it issued passports and maintained "diplomatic" agents. In short, the actual administrative work of the railway, as compared with the extra-administrative activities, were insignificant. The General Manager of the railway appeared to the people much more like a viceroy of the province than a railway executive. "The railway officials," observed an English writer after a special study of the situation during these early years of the railway, "engrossed in the political and strategic aspects of the railway, seemed to have disregarded its commercial possibilities. The result was the imposition of prohibitive tariffs. The railway has thus far done nothing to prosper trade, although the western and eastern sections pass through a country that promises at least reasonable returns on any well-managed line that serves it."*

All these administrative and extra-administrative expenses were charged to the books of the railway. This, together with the lack of the development of traffic, which meant reduced earnings, accumulated a net loss of about 450,000,000 roubles as the result of twelve years of operation from 1905 to 1917. In consequence, at the end of the Tzarist régime the books of the railway showed a total liability of about 850,000,000 roubles against that property. There was a story at the time that the Tzarist Government considered it good policy to swell the cost and debt of the railway so as to make it unattractive for China to redeem at the end of thirty-six years. If this story was true, the Tzarist authorities certainly succeeded splendidly.

Acute Situation from Rouble Depreciation

Following the fall of the Tzarist Government in 1918, the enormous annual subsidies no longer came to the railroad. In order to meet the ensuing difficulties, the General Manager therefore resorted to the issue of bank notes in the name of the railway. In the meantime, the rouble began to depreciate rapidly. It must be remarked here that ever since 1900 rouble notes had flooded the northern part of the Three Eastern Provinces. It is said that Russia really spent little gold in the Far East, and simply shipped car loads of rouble notes to carry on the business. Chinese land, Chinese labor, and Chinese materials for the construction of the railway were paid for in these notes. Chinese goods were bought and shipped to Russia with these notes. As a matter of fact, following the occupation of Manchuria by Russian troops, rouble notes became the currency in the northern part of the Three Eastern Provinces. All business was transacted with them. So a tremendous amount of these notes were absorbed in the country. As the situation in Russia became worse and worse, so the value of the rouble notes depreciated more and more towards zero as a limit.

The effect can readily be appreciated. Everyone in that part of the country suffered in proportion to the number of rouble notes which he was unable to get rid of, as well as in proportion to the loss in value of the notes resulting from his success in passing them out of his hands. There was general suffering all over. Many business houses collapsed; many well-to do people became paupers. The savings of years from the hard labor of the multitudes of working and farming people were wiped out by this process. Judging from the amount of rouble notes held by the Chinese population alone, it almost appears reasonable for the local people to say that in reality Russia built the Chinese Eastern Railway with paper instead of real money.

As the situation in Russia and Siberia became more acute, the Chinese Eastern was affected more and more. There was general chaos and disorder. Strikes and partisan fights became frequent. Murders and assassinations were numerous. Following the fashion of the time, the General Manager of the railway, one day, rode out to a place just outside of Chinese territory and there in his private car declared independence and proclaimed himself the Supreme Ruler of the Russian Far Eastern territory. This briefly shows the general situation of the Chinese Eastern from 1917 to 1920.

Meanwhile the Allied Powers began their expedition into Siberia and eastern Russia. For the latter purpose and for the evacuation of the Czecholosvakian prisoners of war, the Inter-Allied Technical Board was organized, with its headquarters at Harbin, to supervise the technical and economic operation of the Siberia and the Chinese Eastern railways. The eminent American engineer and railroad administrator, John F. Stevens, was made the president of the Board, with a representative each from China, France, Great Britain, Italy, Japan, Russia and Czechoslovakia as members. Some two hundred American railroad men were distributed along the line from Vladivostok to the Ural Mountains, while about fifty Chinese railroad engineers and operating men were appointed by the Board to co-operate with the Americans to supervise the Chinese Eastern section. As the Board was not authorized to discipline the railway employes, and as its orders had to be executed through the old railway staff, naturally many difficulties arose. It was largely due to the ability and personality of Mr. Stevens and the co-operation of the other members of the Board that the duties of the said Board were carried out so well, as was generally recognized by the Allied Governments. About $5,000,000 in gold was spent by the Board for the benefit of the Chinese Eastern and about the same amount was charged by the Chinese Eastern against the Allied Governments for the transportation of the Allied and Czechoslovakian troops. Every now and then, some of the Allied Governments would call the attention of the Chinese Eastern to the amount which the Technical Board was spending for its benefit; and periodically the Chinese Eastern would ask the Allied Governments, which were considered responsible for the handling of the Czechs, to settle the transportation account. And there the matter stands.

The Supplementary Agreement

As the Chinese Eastern Railway is a purely Russo-Chinese enterprise, running through Chinese territory, and as the chaotic condition of the railway was causing China much trouble, the Chinese Government could not but assume some responsibility of control over the railway. Were it in any other country, the Government would perhaps have summarily taken over the railway and run it pending final settlement. China, however, took a rather more circuitous course. As the original agreement was signed with the Russo-Chinese Bank, the Government, in October, 1920, signed a supplementary agreement with the said bank for the temporary management of the railway. This was done on the assumption that the bank was a shareholder of the Chinese Eastern Railway Company, although no one seemed to have seen any shares. It was only the Statutes of the Chinese Eastern Railway Company which made the assumption feasible; because those Statutes provided that, on the presentation of a certificate of that bank or the Bank of Russia, any Chinese or Russian may be recognized as a shareholder at the shareholders' meetings. This is perhaps another one of those wheels within the whole system, as originally arranged in St. Petersburg.

This supplementary agreement, first of all, declared that the activities of the Chinese Eastern Railway should be limited and devoted exclusively to commercial purposes. The Civil Administration, police, etc., were abolished and the work transferred to the local Chinese authorities. Of the ten members of the Board of Directors of the railway, five, including the President of the railway, were to be Chinese and the other five, including the Vice-President, Russians. A Chinese Assistant General Manager was to be appointed and a certain number of Chinese railway men added to the different departments as assistant chiefs. Vacancies in the future were to be filled by Chinese and Russians in an *equitable* manner. All important questions were to be decided by the Board of Directors by the affirmative vote of at least seven members. The payment of five million taels, as required by the original agreement, upon the completion of the line, was to be made good in bonds.

*P.H. Kent—*Railway Enterprises in China*, p. 78, 1907.

Under this agreement, a new Board of Directors was organized. In October, 1920, for the first time in the railway's history, a regular board meeting of ten members was held at the headquarters of the railway at Harbin. To save the railway from further degeneration and to face the complicated situation of 1920 was a job hard enough for any ten men, especially when these men were mostly new to the work as well as new to each other. The first effort of the Board was to face the financial situation. The rouble notes were depreciating rapidly. Up to that time the railway receipts were still in these roubles.

Benefits from Reorganization

The first and perhaps the most effective and beneficial act of the Board was to officially replace the rouble with the Chinese silver dollar which had a steady face value. This step at once put the revenue of the railway on a more stable basis, and gradually reduced the sufferings of the employes from the depreciation of the rouble. Up to that time, as the railway receipts were in roubles, the employes were also paid in roubles, the value of which often diminished by some fifty per cent. from the time an employe received his pay until the time he succeeded in spending it. The accounts of the railway were also changed into the Chinese dollar or the gold rouble as the unit. As about seventy-five per cent. of the shippers and passengers are Chinese and an equally large proportion of the expenses of the railway are local, there is no question that the unit of the railway should be the Chinese dollar, which is the currency of the place.

Gradually other administrative problems were taken up, chief among them the question of tariff and fares. In order to stimulate trade and encourage travel, a considerable reduction was introduced, bringing the tariff and fares, which were doubled during the period from 1918 to 1920, to a general level of about ten per cent. to forty per cent. higher than the pre-war figures. The volume of business was considerably increased to the benefit of the shippers. The locomotives and rolling stock, which were in a most deplorable condition, were gradually repaired, and the train service gradually improved. The current debts of the railway were regularized a little each year. In spite of numerous shortcomings, the result of the four years' work, under the supplementary agreement, showed much improvement in the railway both financially and from an operative point of view. This general improvement was, of course, made possible by the advancement made in the political and military conditions in the country. Although the Chinese and Russian members of the railway sometimes had misunderstandings and differences in their point of veiw, on the whole most of them worked for the good of the railway.

My five years' experience with the Chinese Eastern leads me to believe that among the Russians, with whom I had the opportunity to associate, there were a large number of level-headed and well-meaning men, who showed a high degree of tenacity for what they believed to be their principles. So far as my Russian colleagues and the railway staff are concerned, I found among them many able and well-informed gentlemen. There were indeed exceptions, but one finds exceptions everywhere. On the whole, I think the Russians are a great people with a large heart and a great future. If they will only devote their efforts to the development of their own immense land and to the advancement of their own enormous population, they are bound to progress in all directions.

During the Washington Conference on Disarmament, the Chinese Eastern Railway received considerable attention. Various schemes were discussed. Finally it was agreed among all the participating powers at the Conference that it was to the advantage of all interested parties to have better protection given the railway and the persons engaged in its operation, and by a more careful selection of personnel to secure a more efficient service and more economic use of funds, in order to prevent waste of property. These provisions are definite and clear, in contrast to the negative wording so frequently used in resolutions of such a nature.

Another resolution regarding the Chinese Eastern adopted by the powers, exclusive of China, states that these powers reserve the right to insist upon the responsibility of China for performance and non-performance of obligations towards the foreign shareholders, bondholders and creditors of the Chinese Eastern Railway Company, which obligations the powers deem to result from the contracts under which the railroad was built. This resolution is not so clear as the previous one. It is not definitely known by whom is meant the foreign stockholders and bondholders. As Russia was not represented in the Conference, it may be inferred that these stockholders and bondholders had reference to foreigners other than Russians. But the very contract referred to in the resolution clearly stated that only Russians and Chinese could be stockholders and bondholders of the Chinese Eastern Railway Company. So far as is known, the Chinese Eastern Railway Company never issued any stocks or bonds in the name to any parties other than Chinese and Russians. So far as the foreign creditors of the railway are concerned, there are but few and the amounts due too insignificant to deserve the attention of such an important body as the Conference on Disarmament. Therefore it may be presumed that the real motive back of the Chinese Eastern Railway question at Washington was not stated in the resolutions, but was to be found in the fact that the railway had been, and was at that time an important factor affecting the peace of the Far East.

In May, 1924, an "agreement on general principles," with English as the official text, was signed between the Chinese and the Soviet Governments. First of all this agreement provides for holding a conference, within one month after the signing of the agreement, which "shall conclude to carry out detailed arrangements relative to the Chinese Eastern Railway and other questions, and such detailed arrangements shall be completed in any case not later than six months from the date of the opening of the conference." Article 9 of the "agreement on general principles" is devoted entirely to the Chinese Eastern question. As this article puts the railway on an entirely new basis and is bound to have far-reaching effects, I quote the entire text as follows:

Article IX. The two Governments of the Contracting Parties agree to settle at the aforementioned Conference the question of the Chinese Eastern Railway in conformity with the principles as hereafter provided:

(1) The Governments of the two Contracting Parties declare that the Chinese Eastern Railway is a purely commercial enterprise.

The Governments of the two Contracting Parties mutually declare that with the exception of matters pertaining to the business operations, which are under the direct control of the Chinese Eastern Railway, all other matters affecting the rights of the National and the Local Governments of the Republic of China—such as judicial matters, matters relating to civil administration, military administration, police, municipal government, taxation and land property (with the exception of lands required by the said railway)—shall be administered by the Chinese authorities.

(2) The Governments of the Union of the Soviet Socialist Republics agrees to the redemption by the Government of the Republic of China, with Chinese capital, of the Chinese Eastern Railway, as well as all appurtenant properties, and to the transfer to China of all shares and bonds of the said railway.

(3) The Governments of the two Contracting Parties shall settle at the Conference, as provided in Article 11 of the present Agreement, the amount and conditions governing the redemption as well as the procedure for the transfer of the Chinese Eastern Railway.

(4) The Government of the Union of the Soviet Socialist Republics agrees to be responsible for the entire claims of the shareholders, bondholders and creditors of the Chinese Eastern Railway incurred prior to the Revolution of March 9, 1917.

(5) The Governments of the Contracting Parties mutually agree that the future of the Chinese Eastern Railway shall be determined by the Union of the Soviet Socialist Republics and the Republic of China, to the exclusion of any third party or parties.

(6) The Governments of the two Contracting Parties agree to draw up an arrangement for the provisional management of the Chinese Eastern Railway, pending the settlement of the questions as provided under section (3) of the present Article.

(7) Until the various questions relating to the Chinese Eastern Railway are settled at the Conference, as provided in Article 11 of the present Agreement, the rights of the two Governments arising out of the Contract of August 27, 1896, for the construction and operation of the Chinese Eastern, which do not conflict with the present Agreement and the Agreement for the provincial management of the said railway and which do not prejudice China's right of sovereignty, shall be maintained.

The question of redemption will naturally form one of the most important topics in the coming conference. Russia definitely pledges that China may redeem the railway, but leaves the amount

and conditions governing the redemption to be arranged in the conference. No principle to govern the conditions and amount of redemption was laid down in this " agreement on general principles." This latter provision was altered a trifle by the agreement signed between the Soviet Government and the Three Eastern Provinces, which was later embodied in the Governmental agreements. By this, the Soviet Government " agrees.....to the redemption by China of the said railway with Chinese capital, the actual and fair cost of which to be fixed by the two contracting parties."

A careful reading of these articles will lead one to feel that it must have required much skill to frame the terms in such a pleasant way and yet make them so elastic, if not ambiguous. The circumstances which lead to the adoption of such elastic language must have been extraordinary, if not interesting. Indeed, much will depend upon what takes place in the promised conference. One thing we can prophesy: That is that whatever difficulties may lie in the agreement will be found not in what has been said, but in what has *not* been said!

The arrangement for the provisional administration of the railway, as referred to in section (6), article 9, of the " agreement on general principles," consists of eleven articles. The provisions of this arrangement, as modified by the Soviet-Mukden agreement, very much resemble those of the supplementary agreement of 1920, with the Soviet Government taking the place of the Russo-Chinese Bank. The main differences are: that the time limit for the railway's return to China, free of charge, be reduced from eighty to sixty years; that all positions of the railway should be filled by Chinese and Russians in *equal* numbers; that, pending final settlement of the railway, as provided in article 9, the net profits of the railway should be held by the Board of Directors; and that all questions of the railway, which the Board of Directors cannot decide, must be referred to the two Governments for settlement.

A careful study of this agreement will suggest at once that, unless the Chinese and Russian members of the Board of Directors are properly selected and given full power and definite instruction to manage the railway as a purely commercial business, with the sole aim of serving the public and making a fair return to the railway, much difficulty may arise. The fact that all questions will have to be decided by the affirmative vote fo six members of the Board in practice amounts to the mutual agreement of all the Chinese and Russian members. This will require that they must have a common point of view and a common interest in which both parties share equally. They must consider the railway as their own business and their own property and exert every effort to make the railway a business success. Any other motive or any effort on the part of either party to " edge out" the other will result in loggerheads.

Two other provisions of the agreement may create difficulties. First, the provision that all disagreements between the Chinese and Russian members of the Board of Directors should be referred to the two Governments for solution, will likely prove unwholesome, if not mischievous. There are numerous chances for a board so constituted to disagree; and when such disagreement will have to be settled by two governments through diplomatic channels, the railway's business is liable to degenerate into a whirlpool of diplomatic squabbles. Arbitration would certainly have been a much better method of settling such differences, if the two Governments are eager to prevent the railway from giving constant irritation.

The provision that the articles of the old agreement of 1896 and the Chinese Eastern Railway Statutes, which do not conflict with the present instruments, shall remain valid, is also misleading. These old Statutes were so long, so involved, so complicated, and so out of date, that there will be ample room for the two parties to disagree as to which article does or does not conflict with the present agreement. Fortunately, there is a clause in the new agreement calling for the revision of these Statutes within six months. This revision should have been the first duty of the new Board of Directors. The latter have taken charge of the railway since October, 1924. So far as it is known, no successful attempt has yet been made to carry out this most important provision. Therefore, they must have been working without any definite rules for guidance. Under such circumstances conflicts of opinion should be inevitable.

To have two Governments as partners in a railway business, on a half and half basis, is a new experiment. To date China has had enough trouble with the Chinese Eastern. Russia gained but little from her efforts in reading extraordinary meanings into the Chinese Eastern Railway Agreements in the past. It is to be hoped that in the future good faith on both sides will prove to the world that the experiment is a success, and that it will once for all put an end to the anxiety, suspicion and mischief which the Chinese Eastern has created in the past. If this new experiment should fail, it would seem that a totally different experiment will have to be tried, in order to prevent a repetition of what has happened in the last thirty years. At any rate and under all circumstances, all the extraordinary activities of the Chinese Eastern and other railways in the Three Eastern Provinces should be eliminated. All the railways in the Three Eastern Provinces should be managed entirely for commercial purposes and run as highways open to all foreign business on an equal basis. Otherwise China's integrity will remain violated and the open door meaningless.

Su Hwa Chalk Factory, Wuchang

The Su Hwa Chalk Factory, at Ku Tung Chieh, outside Wushengmen, Wuchang, Hupeh province, established about 20 years ago, turns out white and green coloured chalks. The factory employes about ten operatives and has a daily producing capacity of 150 boxes of 100 pieces each. The quality of the chalk is said to compare favorably with the imported kind. The factory serves an extensive market, the bulk of its product being consumed in the schools of Wuchang, Hankow, Hanyang and other big cities in Hupeh and Hunan provinces. The yearly output is estimated at 50,000 boxes, sold under the " peach " brand. The process of manufacturing chalk is rather simple. The principal raw materials are gypsum and lime. Gypsum is first burnt and pulverized and then mixed with lime. The mixture is placed in a wooden tank, into which water is added, and is thoroughly stirred with a wooden rod. If colored chalks are desired, pigment is added. The contents are then poured into a row of brass molds, in which the chalks take form as they harden. They are then dried in the sun, after which they are packed in card-board boxes for the market. Each box, containing 100 pieces, is sold wholesale at $1.07 (seven cents), but the retailers sell them for $0.12 (12 cents). The brass molds, hitherto imported from Japan, are now made by the local metal smiths. Each set or row of molds, capable of making 15 pieces at a time, costs about $20. The chalk market in Hupeh and Hunan provinces was monopolized by the Su Hwa Factory until last year, when the Chung Hwa Book Company opened a factory at Hanyang. In spite of this new rival, the business of the Su Hwa Factory is just as prosperous as before, as the demand for chalk is on the increase.

Glass Industry at Poshan, Shantung

Poshan, besides producing pane glass, is also noted for Shantung spun glass, which is much used in the manufacture of decorative screems. These are exceedingly popular among the Chinese, being sold within the limits of an ordinary purse. Travellers invariably purchase some as souvenirs. They are obtainable in Peking, Tientsin, Nanking, Shanghai, and the Manchurian provinces. They are also gradually finding their way to foreign countries as novelty goods. In Tsinan alone there are more than ten shops engaged in retailing these screens. Teh Shen Tung, Ho Hsin Hou, Chen Hsin Yu, Shieh Chen, Heng Yung Chang, and Si Ching Yu, are the leading dealers. In Poshan, six factories turn out this spun glass. They are: Chang Ching, Hua Tai, Fu Tai, Shieh Chen Hao, Jen Ho, and Chung Ho. Raw material is locally produced, at Tao Hua Chuan in the vicinity of Fu Lao Kwan, Poshan district. The exact method of manufacturing is unknown, several processes having to be gone through before that which gives it its dull crinkly appearance. The glass is in twin pieces, between which pictures are pasted. The whole makes a very attractive wall decoration. Small glass factories have existed for centuries in the neighborhood of Poshan. The surrounding hills provide abundant quartz sand, limestones, and coal. The ware produced is well-known all over China, especially in the shape of small snuff bottles, laboriously painted on the inside, lanterns and screens and thousands of other small articles such as mouthpieces for pipes, children's toys, beads, and bangles. Except for a few modern factories, it is mainly a family industry, most of the ovens not holding above 60 catties of glass.

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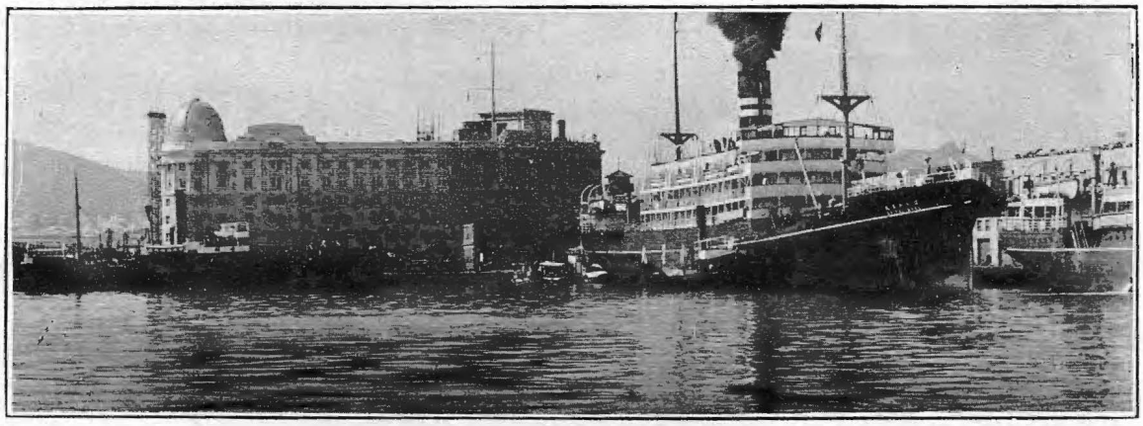

Dairen Wharves

DAIREN WHARVES

On the Second Wharf, Dairen, is a Waiting Station with accommodations for 5,000 people and containing the Bank of Chosen Exchange, Osaka Shosen Kaisha's Ticket Office, Dairen Kisen Kaisha's Ticket Office, Information Bureau, Shops, Dining Room, Special Waiting Room, Ladies' Waiting Room, Exhibits of Manchurian and Mongolian Products, Barber Shop, etc.

Passengers embark by means of a Portable Platform direct from the Station. Both the Dairen Wharf Office Building and the Waiting Station are built of reinforced concrete, and are the best of their kind in the Far East in point of architectural beauty.

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

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In this issue appear the following Articles by Mr. George Bronson Rea from Europe:

HOW RUSSIA MAY BE CHECKED

DISARMAMENT, DIESEL ENGINES AND OIL

THROWING BRICKS AT JAPAN

WHAT'S THE MATTER WITH ENGLAND?

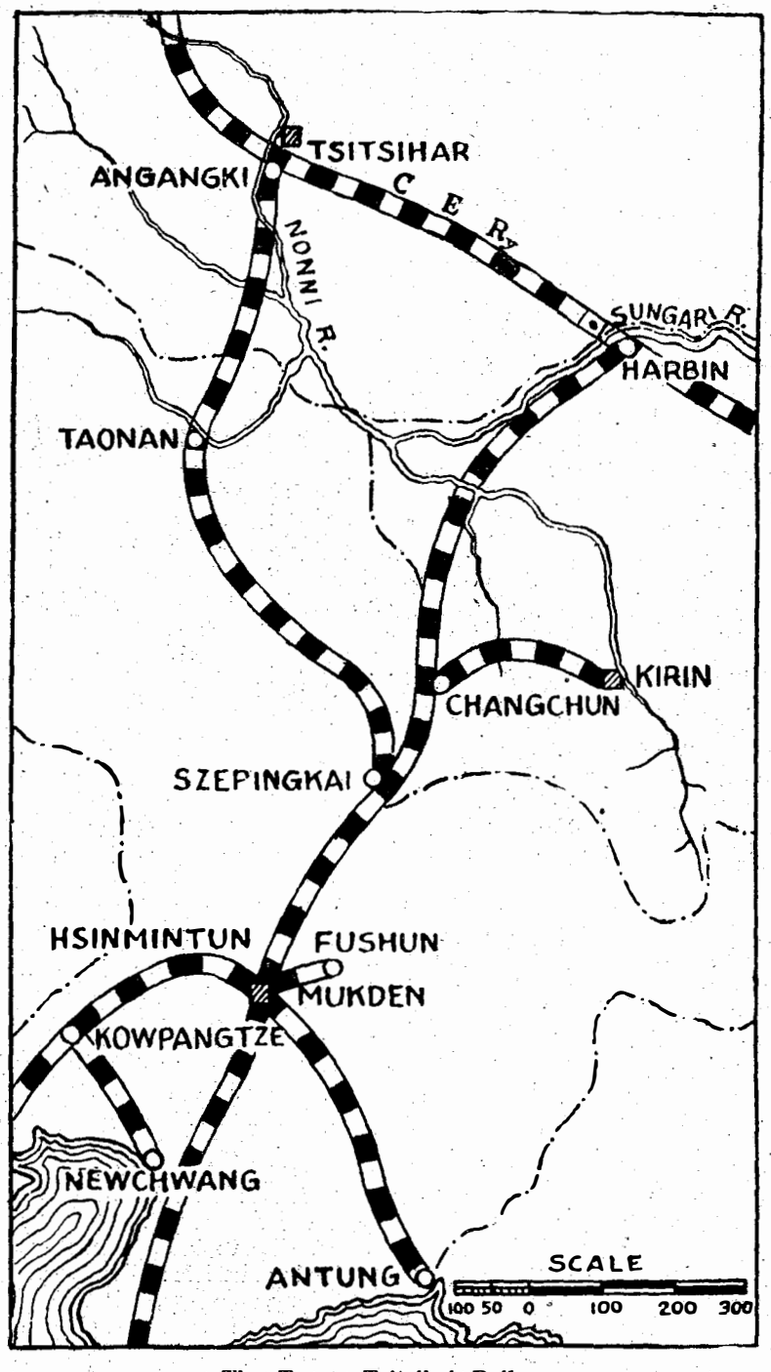
Vol. XXII | July, 1926 | No. 7

Railway Struggle in Manchuria

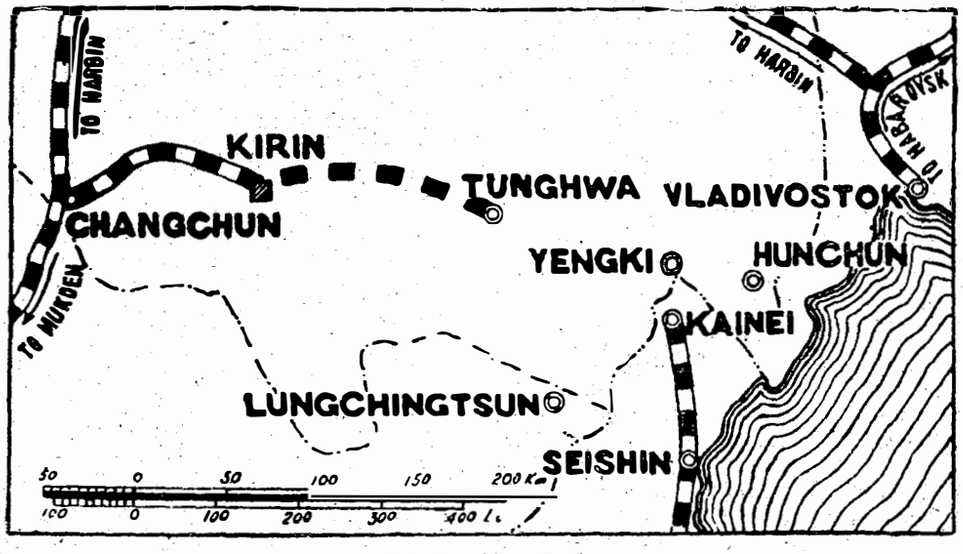
THOUGH the year 1925 was throughout a period of unrest and uncertainty, the inhabitants of the two northern Manchurian provinces were fortunate in comparison with those of many other parts of China, says Mr. U. Marconi, Acting Commissioner of Customs for Harbin, in his 1925 report. The district was entirely free from civil war, no serious disturbances of the peace occurred, neither plague, famine, nor floods were experienced, and communications with the outside world were never interrupted.

Owing to the proximity of Russia and to the presence of a Russian population estimated at about 200,000, Sino-Russian relations are of paramount importance to North Manchuria. The Agreements signed at Peking and Mukden in May and September 1924, and the change in the management of the Chinese Eastern Railway which followed in October, while putting an end to the abnormal situation existing between the two countries since 1917, have in their turn produced a crop of difficulties of a very delicate nature, which, however, have not resulted in any obstruction to trade.

One consequence of these Agreements was a change in the relations between the Chinese Eastern Railway and the South Manchuria Railway, the Russians desiring to encourage by every means the use of the Suifenho-Vladivostok route as against the Changchun-Dairen one, and the Japanese on their side pushing on the construction of the Taonan-Tsitsihar line, which runs parallel to and will, it is expected, prove a formidable competitor of the southern branch of the Chinese Eastern Railway. The Japanese have also other railway extension schemes on foot, which, if realised, will tend to draw the produce of North Manchuria and Mongolia in the direction of Dairen. As a counter-measure the Russians have proposed constructing several branch lines connecting up with the main Chinese Eastern Railway line. The suggested lines are: (1) Angangki-Tsitsihar; (2) Hailin-Makiachuankow, crossing the fertile plain of Hulan; and (3) Mishan-Muling, traversing a coal-bearing district. The first-named line is intended to compete with the Taonan-Tsitsihar line mentioned above. Nothing definite has so far been arranged in connexion with the above proposals. However, no matter who builds the railways nor for what purpose they are built, their construction should eventually bring nothing but benefit to the district and its inhabitants generally.



The Taonan-Tsitsihai Railway



Kirin-Lunghua Railway

An agreement between the South Manchuria and Ussuri Railways was reached in the summer for a redistribution of export freights on a Vladivostok 55 per cent. Dairen 45 per cent. basis, that is to say, should the stipulated proportion be exceeded, the railway profiting thereby must compensate its neighbor for the loss entailed.

In the Trade Report for 1924 mention was made of the declaration in November of that year of a "free area" in the port of Vladivostok, with a view to attracting exports in that direction. That the object has been to some extent attained is now, after the lapse of 14 months, clear, but the degree of success has fallen considerably short of what was expected. Vladivostok has not yet introduced any system like the one in operation in Dairen, whereby the shipper, as soon as his beans or other staple cargo have been stored in one of the South Manchuria Railway Company's warehouses, can take his warehouse receipts to any of the foreign banks in Dairen and obtain his money less a small percentage for handling charges. On the other hand, foreign goods destined for Harbin pay no duties at Vladivostok and are first liable to examination at their destination, where Customs formalities may be performed in the presence of the consignee himself. If such goods are imported through Dairen, not only have they to pass the Customs and pay duty there—thus making the employment of a forwarding agent necessary,—but also they are liable to transhipment at Changchun, whereas from

Vladivostok to Harbin all freight proceeds direct. The one-third duty reduction privilege which all goods imported or exported *via* the Chinese Eastern Railway still enjoy and the Duty Free List (provided for in the Sino-Russian Treaty of 1881) are further factors in favor of Vladivostok.

Up to the present time British and American importers have not used Vladivostok to any considerable extent, while Japanese firms naturally contiue to prefer the Dairen route. Consignments of machinery from Germany, kerosene from ports in European Russia, and sugar from Java were imported into Manchuria *via* Vladivostok during 1925.

Sulphur Mines in Shansi

WANGFENGSHAN, Taiyuan, Shansi province, is a sulphur-producing center. Deposits have been discovered in more than a dozen places, including Paishuikou, Shihtsaokou, Kaoshengmiao, Yuanchishan, etc. The mines are located mostly in hilly or mountainous regions, where, in the absence of transportation facilities, large scale mining is still impossible. Four companies, the Wang Feng Sulphur Mining Company, the New Sulphur Mining Company, the Han Wen Jen Sulphur Mining Company, and the Ching Feng Sulphur Mining Company are working on a comparatively large scale, in addition to about a dozen private miners, whose output is hardly worth mentioning, owing to the limited amount of their capital.

Sulphur ores generally occur in sandstone and calcareous sandstone strata, the latter, especially, bearing close relation to sulphur ores. The ores found in the calcareous sandstone strata are always in a pure condition. The layers, as a rule, are only about one or two feet thick, and the shafts are always narrow, admitting one miner at a time, who can only work on all-fours. In Wangfengshan there are also a few coal mines, but the sulphur mines are never found in close proximity to the coal. Wherever the coal mines are found, all traces of sulphur ores disappear.

The sulphur ores worked out from the Wangfengshan mines are always inter-bedded in sandstones, but easy to separate. When a stone containing the ore is broken with an iron hammer, the sulphur ore freely separates itself from the stone. The method of purifying the ores is simple and crude. The outfit consists of only a porcelain jar and a fireclay funnel in the shape of a trumpet. The narrower end of the funnel is inserted into the porcelain jar, which is used as the receptacle, and sulphur ores are loaded into the funnel through the open-mouthed end. The porcelain jars, usually in a set of three or four with as many funnels, are then placed in a hole just below the ground so as to leave the open-mouthed end of the funnels just above the ground. The funnels are then surrounded with fuel, usually coal, which is further banked on all sides with earth so as to facilitate burning. A fire is then built in the coal, and fanned with bellows. When the coal reaches a sufficiently high temperature to melt the ores, the sulphur is reduced to a liquid state and flows into the porcelain jar through the narrower end of the funnel. The burning of the ores goes on for about 24 hours before all the sulphur ores in the funnel are melted. They then flow into the jar. The residue is discarded. The liquid sulphur in the jar is then taken out with an iron ladle or dipper and poured into small pottery vessels. When the sulphur again solidifies on cooling, it becomes greenish yellow in color. The article is then ready for the market.

The output of the four sulphur mining companies mentioned above varies according to capital and working capacity. The Wang Feng Sulphur Mining Company is financed with a capital of $15,000, and has been in existence since the Manchu dynasty. It was promoted by Liu To-ching, and its mining area covers about 500-600 mow. During the first few years of the Republic the company was highly prosperous, due to the absence of competition. A considerable quantity of sulphur was produced yearly. But since the establishment of the three new companies, its business has suffered a set-back. The New Sulphur Mining Company was promoted by Kuo Yao-tong, with a capital of about $6,000. Its yearly output at present is estimated at between 70,000 and 80,000 catties of purified sulphur. The Han Wen-jen Sulphur Mining Company was started by Han Wen-jen with a capital of $10,000. It has a mining area of 100 mow and turns out over 100,000 catties of purified sulphur yearly. The Ching Feng Sulphur Mining Company was promoted by Wang Shao-lu with a capital of several thousand dollars. This company has a rather limited quantity of sulphur ores of its own production, but collects the purified sulphur from the neighboring small scale miners and sells at a profit. The dozen other small scale miners have a yearly output of several thousand to ten thousand catties each. Before 1921 the total output of sulphur from the different mines in Taiyuan amounted to 800,000—1,000,000 catties, but the quantity has been decreasing since the organisation of the Bureau for Government Monopoly of Sulphur and Saltpetre. This Bureau forbids unauthorised sale and transportation of sulphur, and this has in some way interfered with the business of the mining companies, whose operations are now frequently suspended.

In 1916 and 1917 the total yearly output of the Wangfengshan mines alone amounted to nearly 1,000,000 catties, which found a ready market in both Shansi and the neighboring provinces such as Shantung and Honan. A large quantity of sulphur is consumed yearly by the Government Arsenal at Tehchow, Shantung province, and the balance is chiefly sold to firecracker makers. The Government arsenal and someother provincial government factories in Shansi province also consume certain quantities every year. The market price has advanced greatly in recent years. In 1917 and 1918 a catty of sulphur was sold at $5—$6 on the Shansi local market, but now it has gone up to over $10. The tax on sulphur has also been raised from 18 cash to $0.08 (eight cents) a catty. Since the inauguration of the Government Monopoly of Sulphur and Saltpetre, the public is forbidden to sell and purchase sulphur privately. Any miner with sulphur to sell must first bring the article to the Bureau for examination and price-fixing. Any private buyer of sulphur, if he is a native of Shansi province, must first obtain a licence from the Bureau, while exporters from other provinces must have their consignments covered with a permit from the Ministry of War. Unauthorised purchase and transportation of sulphur are strictly forbidden.

The Government Monopoly of Sulphur and Saltpetre was reorganised in 1920 from the former Government Monopoly of Saltpetre. It has 14 branch offices, including four inspectorates, and 12 agencies throughout the province. It has a capital of $50,000 appropriated from the Shansi treasury. The agencies are generally farmed out to local public bodies such as the district Chambers of Commerce and the local Government revenue offices and also to wealthy private persons. A prospective agent must pay a certain deposit and enter into a contract with the Bureau. The contract runs for a year, but is subject to renewal at the expiration of that term. Up to the present, agencies have been established in the following districts : Pingyang, Hoku, Chiehchow, Hunyuan, Tatung, Sohchow, Hoshun, Linhsien, Puchow, Kiangchow, Sichow, and Hohsien. Each of the agencies has jurisdiction over more than one district. For instance, the agency at Pingyang has jurisdiction over seven or eight districts. So these agencies, together with the branch offices, cover practically all the districts in the province. As most of the districts in Shansi do not produce sulphur, the agencies and branch offices there monopolise the local market, no trade being allowed between private persons without the knowledge and permission of these authorities.

In addition to the mines in Taiyuan, which at present form the best known sulphur producing center in the province, sulphur ores are also produced from the mines at Chingchiachwang and Yaokou, Fengshihsien and Shangyangpu, Lingshihhsien. In those regions no mining company operating on any large scale has yet made its appearance. The mines are being worked by a number of private persons, whose method of mining is primitive. The total yearly output at each place is estimated at a little over 10,000 catties only. Iron pyrite ores are also produced in many places in Shansi province. From this ore sulphur can be extracted. For the present, no official statistics are available in regard to the mines yielding pyrite ores in the province, although in certain places moderate quantities of such ores have been turned out by small-scale mines. The regulations issued by the Government Monopoly of Sulphur and Saltpetre include the iron pyrite ores among the Government monopolies, and prohibit the mining of such ores by private persons without authorisation. It is believed that large quantities of sulphur can be obtained from the iron pyrite ores in Shansi province yearly, if large scale operations could be started in the mines.

Pericle A. Chieri

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路拾六號

遠東時報

MANCHURIA

THE UNSEEN HERO OF THE GENERAL STRIKE

REPLY TO CERTAIN ALLEGATIONS CONCERNING LABOR CONDITIONS IN JAPAN

MANCHURIA IN TWENTY YEARS

THE NEW RAILWAYS OF MANCHURIA

PRELIMINARY PROJECT FOR CANTON OUTER HARBOR

HEAVY-DUTY GOODS LOCOMOTIVES

THE CONSTRUCTION OF THE YODO-GAWA OHASHI

MACHINERY MARKETS OF NETHERLANDS EAST INDIES

Vol. XXII August, 1926 No. 8

SHANGHAI, PEKING, TOKYO AND MANILA

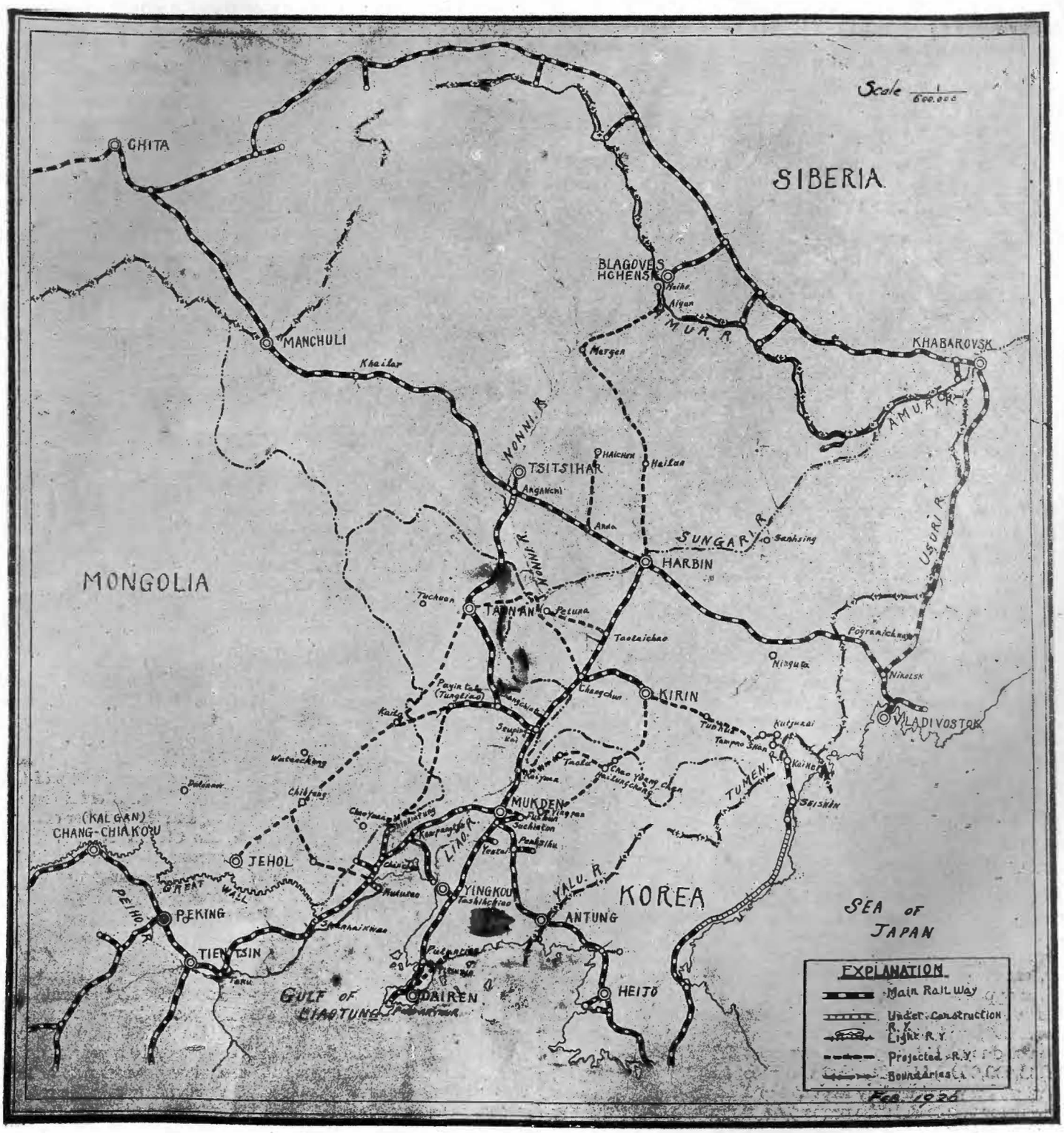
The New Railways of Manchuria

THE following summary of the railway situation in Manchuria is not official but it shows what is being done. The Chinese themselves own the new railways in Manchuria, and they have of recent years shown much interest in building new lines. This is due not only to the fact that in this way the country is being developed and general prosperity and, consequently, the government revenues are increased, but also to the fact that individual Chinese high officials have found that much profit may be derived from opening railways through lands which they already hold or acquire for the purpose, the increased value of such being, of course, productive of great and immediate returns.

The Chinese authorities have borrowed funds from Japanese capitalists but from the contracts, it will be seen what a small measure of control, the Japanese capitalist have in the management of the railways.

Hulan-Hailun

This line is being built by the Chinese, with Mr. Ostroumoff, formerly (White Russian) manager of the Chinese Eastern Railway as engineer in charge of construction, the funds being furnished by the Heilungkiang Government and also by Governor Wu from his personal funds. The section from Hulan to Suihua, 50 miles in



length, is, it is understood, to be completed by the end of 1926, while the section from Suihua to Hailun, 62 miles in length, is to be finished later. Governor Wu plans to extend this system further northwards and westwards and eventually, probably, to connect it with a line running north from Taitsihar towards Blagoveshensk, this additional development being, he states, dependent on the matter of funds. This is thus entirely a Chinese enterprise, and the only connection which the Japanese have therewith lies in the fact that the South Manchuria Railway Co. acts as a purchasing agent for certain materials, its only specific interest lying, however, in the fact that this line is being constructed on standard gauge, the same as the Chinese Government Railways and the lines of the S.M.R., and not on the five foot gauge employed by the Russian State Railways and the Chinese Eastern line. It may be mentioned that American firms have obtained large contracts for delivery of materials for this line.

Ssupingkai-Chenchiatun-Paiantala-Taonan-Anganchi Lines

These lines were built at various times under a series of separate agreements which may be summarized as follows:

Ssupingkai-Chenchiatun

This line was financed under an agreement, in 1915, between the Chinese Government and the Yokohama Specie Bank, to the interests of which the S.M.R. later succeeded. In accordance with this, a loan of Y.5,000,000 was actually floated, and the rest of the money was advanced by the S.M.R. and forms part of a Y.32,000,000 loan later advanced by the S.M.R. The terms of this agreement were essentially the same as those of the Chenchiatun-Taonan agreements. Both agreements provided that the S.M.R. or the Yokohama Specie Bank respectively should act as purchasing agents. The line was built by the Chinese. Interest has been paid on the Y.5,000,000 loan, but the interest accruing on the other advances has year by year been added to the principal. This line should be able to pay interest this year, though no inclination to do so is apparent, and the matter is now being taken up by the Japanese with the Peking Government. Owing, however, to the shadowy form of control of Peking, it is questionable if any order from it that the interest be paid would be obeyed. If interest be added constantly to the principal, the total will soon exceed the value of the railway property in which case Japan will benefit only from the fact that the line acts as a feeder to the S.M.R.

Later this contract was merged with that of the Chenchiatun-Taonan-Paiantala contract (which will be described in the next paragraph) and the arrangement for representation of the Japanese interests are consequently the same for the entire Ssupingkai-Chenchiatun-Paiantala-Taonan section, as will be set forth in the following paragraph.

Chenchiatun-Taonan-Paiantala

The Ssupingkai-Chenchiatun line was continued by a branch to Paiantala and by an extension to Taonan. The S.M.R. was empowered, in 1919, by the Peking Government to float a loan for building these lines, the amount to be Y.45,000,000 at 5 per cent. interest, and with a term of 40 years. It was, however, impossible to float a loan at such a low interest rate, and as the agreement provided that in such contingency the S.M.R. should enter into an agreement to advance short term loans for the money needed, this course was taken. Under the original contract the S.M.R. was only to arrange the financing, the Chinese to build the road themselves, but it was found expedient, entirely outside of the contract, by the Chinese to contract with the S.M.R. for the building of part of the line. It was provided that during the construction the Chinese Bureau of Communications must engage a Japanese chief engineer with staff, but after its completion a Japanese maintenance engineer, chief accountant and traffic manager, should be recommended for appointment by the S.M.R. Under the short term loan arrangement, sums were advanced from time to time as construction progressed, and the loans were renewed from year to year, with interest due added, so that the sum total now due amounts to about Y.32,000,000. The interest was placed at a rate averaging 9 per cent. and was not unduly high at the time the loan was made. The security for this loan is the property and revenue of the railway and it is guaranteed by the income of the Central Government at Peking. At present the Bureau of Communications favors the floating of a loan of Y.45,000,000, but it is evident that the interest rate must be higher than the 5 per cent. provided in the original loan proposition, and, furthermore, the bankers interested want the amortization period shortened and also want the loan to be guaranteed by the S.M.R., so this matter remains in an indefinite state and the difficulties connected therewith are such that the outlook for realization of the proposition does not seem very promising.

Taonan-Anganchi

The Taonan-Anganchi agreement provides that the S.M.R. shall build a railway between the points mentioned, within a period, of about two years, each section to be handed over to the Director General of the Railway Bureau when completed, the revenues accruing from traffic to be taken by the Railway Bureau. The Director is to purchase land, materials for construction and equipment with funds advanced by the S.M.R. In purchasing such articles from abroad, the practice is to be observed to buy in the open market at lowest rates for good quality, preference to be given to Chinese goods over Japanese or other foreign goods. The payment for the fulfillment of the contract is fixed at Y.12,920,000. Upon completion of construction, the provincial government is to pay that sum to the S.M.R., but any amount thereof which remains unpaid at the end of a period of six months from the date of transfer of the line shall be turned into a loan, for a period of forty years, and bearing interest at 9 per cent., to be paid from the revenues of the railway or from such other funds as the provincial authorities may elect. The principal of the loan shall be amortized in thirty years by installments, commencing from the eleventh year from the date of transfer, and on repayment of the principal the contract shall be invalidated. The contract will also be nullified at any time within the forty years when the complete principal and interest shall have been paid. The Chinese have, however, the right to redeem the loan at any time. The loan is secured by a lien on all the railway properties. The S.M.R. has the right to appoint an adviser who shall supervise for the Railway Bureau all expenditures and revenues of the railway and who shall countersign with the Director General all documents relating to its expenditures. He may engage not more than two Japanese assistants.

Kirin-Changchun

In 1908 an agreement was concluded between the Chinese Government and the South Manchuria Railway Company relating to the financing of the line between Changchun and Kirin, the entire sum required for the construction of this line being Y.4,300,000, half of which was advanced by the S.M.R., the remainder being furnished by the Chinese Government. The financing only was a joint enterprise, but the road was built and managed by the Chinese, though the chief engineer and chief accountant were appointed, one by the recommendation of the S.M.R. by the Chinese and the other by the recommendation of the Chinese by the S.M.R. Later, in 1917, a new loan was advanced by the S.M.R. in the sum of Y. 6,500,000, for a term of thirty years, the loan being issued at the rate of Y.91.50 per Y.100, with interest at 5 per cent., and part of this loan was applied to the payment of the original advance made by the S.M.R. At this time also the management of the line was entrusted to the S.M.R., which appointed a chief engineer, a traffic manager, and a chief accountant, and the number of Japanese employees was increased, although the Chinese remain the heads of the concern. The terms of this agreement have it that having "in view of the splendid results of the management of the South Manchuria Railway" the Chinese Government entrusts the mangement of the Changchun-Kirin Railway to the S.M.R. Interest on this loan has been paid as well as an annual payment of 20 per cent. of the net profits of the line, according to a provision contained in the new agreement. This arrangement has, however, not been as profitable as might appear owing to the fact that the profits, which were quite attractive during the war years, have fallen in recent years so that they amount now to about Y.400,000 annually, of which the share of the S.M.R. is about Y.80,000 a year. When one takes into consideration the extremely low interest rate of the loan compared to the rates of interest now prevailing and the rates being paid by the S.M.R. for its own loans, even as high as 9 per cent.,

the actual returns on this loan are not high, even in spite of the premium of issue. Furthermore, the S.M.R. has made it a practice to apply part of the amount of its share, voluntarily, to subsidies to schools in the region served by the line and for similar public benefits. It should also be noted that the new Kirin-Tunhua agreement contains a clause whereby the Chinese Government may propose to bring the entire line from Changchun to Tunhua under Chinese management when the new section has been completed.

Kirin-Tunhua

This line, which extends from the Kirin terminus of the Changchun-Kirin line in an easterly direction, is being built (Construction having begun in June, 1926) under a contract concluded between the Minister of Communications of the Chinese Government (Peking) and the South Manchuria Railway Co. under which the line is to be completed in about two years. The specified amount of the contract is Y.18,000,000 (without discount) which is to be advanced by the S.M.R. for construction and equipment at the request of the Chinese Director General. It is provided that in case unforeseen circumstances shall make it necessary, this amount may be increased by agreement. Interest is fixed at 9 per cent. The (Chinese) Director General is to control the entire business of this line, but shall engage a Japanese chief engineer of the S.M.R. service who shall retire when construction has been completed, and who shall, under the direction of the Director General, attend to the construction and countersign all documents relating to receipts and expenses. The chief engineer may, at the request of the Director General, employ Japanese assistants. The chief engineer shall, with the approval of the Director General, purchase materials, and it is provided that where Chinese materials are equal in quality and price to those of Japanese or other manufacture, the former shall be given preference. In construction Chinese contractors are also to be given preference. On completion the Director General shall open the line for traffic and conduct it, with full authority, under the general rules of the Chinese State Railways, but he shall engage a Japanese chief accountant, who shall have charge of the accounts, following the rules of the Chinese State Railways, and who shall countersign all documents relating to receipts and expenditures. His tenure of office shall extend until the advances made by the S.M.R. shall have been paid in full. Such payment is to be made upon acceptance of the line on its completion, but in case such payment, in part or in full, shall not be made then, the Minister may postpone payment, for which the property of the railway shall be security. In such case payment is to be made in installments within 30 years or at any earlier date, but the Chinese have the right to repay the loan at any time. The receipts of the road are to be deposited by division in Chinese and Japanese banks.

General Remarks

It may be noted that of the contracts concluded between the Japanese and Chinese authorities, those of an early date are more advantageous to Japan than those following. The early agreements strove to follow the terms usually included in such contracts between other nationals and the Chinese in other parts of China, such as, for instance, the Tientsin-Pukow line contract. The contracts made by the Japanese in later years show, however, a decreasing number of safeguards and a decreasing measure of influence in the affairs of the lines for which loans have been advanced. It will thus be seen that the administrative officials remain Chinese and that (with the exception of the Changchun-Kirin line in which a special, temporary, contract for the management of the line has been entered into under the conditions specified heretofore) such Japanese accountants and others as are employed have no power of initiative but only that of countersigning vouchers and the like.

It is worthy of note that the contracts which contain the provision whereby the Peking Government guarantees the payment of the loan from its revenues, must, in the light of the chronically impecunious condition of the Peking treasury, seem almost an irony.

To sum up then, it is evident that such "control" as the Japanese have in the Chinese lines in which they have become interested by money advances is nominal rather than practical, and, further, that the terms of the loans are far from attractive; at least, they are far less so than are those of the loans furnished by various European interests for railroad enterprises in other parts of China; and the benefits which the Japanese draw from them lie, not in any financial returns from the loans nor in control of the roads which have been built through these means, but in the admittedly important consideration that these lines operate as feeders to the main system of the South Manchuria Railway and thus contribute substantial increases to the freight volume which it carries.

"Agreement Between the Government of the Union of Soviet Socialist Republics and the Government of the Autonomous Three Eastern Provinces of the Republic of China"

(Rosta Service) Signed at Mukden, October 8, 1924.

Peking, October 7:—In view of the large amount of interest in the Mukden agreement, the Rosta News Agency is in a position to publish the following text, which is one of the final draft as co-ordinated by both Parties and signed at Mukden. However, original signed document has not yet been received at Peking, so that in the text that follows the names of those who signed it as well as some other details have naturally been omitted.

The Government of the Union of Soviet Socialist Republics and the Government of the Autonomous Three Eastern Provinces of the Republic of China, desiring to promote the friendly relations and regulate the questions affecting the interests of both Parties, have agreed to conclude an Agreement between the two Parties, and to that end named as Plenipotentiaries, that is to say:

The Government of the Union of Soviet Socialist Republics: . . .

The Government of the Autonomous Three Eastern Provinces of the Republic of China: . . . . . .

Article I—The Chinese Eastern Railway

The Governments of the two Contracting Parties agree to settle the question of the Chinese Eastern Railway as hereinafter provided:—

(1) The Governments of the two Contracting Parties declare that the Chinese Eastern Railway is a purely commercial enterprise.

The Government of the Contracting Parties declare that with the exception of matters pertaining to the business operations which are under the direct control of the Chinese Eastern Railway, all other matters affecting the rights of the National and the Local Governments of the Republic of China such as judicial matters, matters relating to civil administration, military administration, police, municipal government, taxation and landed property (with the exception of lands required by the Chinese Eastern Railway itself) shall be administered by the Chinese Authorities.

(2) The time-limit as provided in Article XII of the Contract for the Construction and Operation of the Chinese Eastern Railway of September 8, 1926, shall be reduced from eighty to sixty years, at the expiration of which the Government of China shall enter gratis into possession of the said Railway and its appurtenant properties.

Upon the consent of both Contracting Parties, the question of a further reduction of the said time-limit (that is, sixty years) may be discussed.

From the date of signing the present agreement the Union of Soviet Socialist Republics agrees that China has the right to redeem the Chinese Eastern Railway. At the time of redemption, the two Contracting Parties shall determine what the Chinese Railway had actually cost, and it shall be redeemed by China with Chinese capital at a fair price.

(3) The Government of the Union of Soviet Socialist Republics agrees in a Commission to be organised by the two Contracting Parties to settle the question of the obligations of the Chinese Eastern Railway Company in accordance with Section IV of Article IX of the Agreement on General Principles for the Settlement of the questions between the Union on Soviet Socialist Republics and the Republic of China signed on May 31, 1924, at Peking.

(4) The Governments of the two Contracting Parties mutually agree that the future of the Chinese Eastern Railway shall be determined by the Union of Soviet Socialist Republics and China to the exclusion of any third party or parties.

(5) The Contract for the Construction and Operation of the Chinese Eastern Railway of August 27/September 8, 1896, shall be completely revised, in accordance with the terms specified in this Agreement, by a Commission of the two Contracting Parties in four months from the date of signing the present Agreement. Pending the revision, the rights of the two Governments arising out of this Contract, which do not prejudice China's rights of sovereignty, shall be maintained.

(6) The Railway shall establish, for discussion and decision of all matters relating to the Chinese Eastern Railway, a Board of Directors to be composed of ten persons, of whom five shall be appointed by the Union of Soviet Socialist Republics and five by China.

China shall appoint one of the Chinese Directors as President of the Board of Directors, who shall be ex-officio the Director-General.

The Union of Soviet Socialist Republics shall appoint one of the Russian Directors as Vice-President of the Board of Directors, who shall be ex-officio the Assistant Director-General.

Seven persons shall constitute a quorum, and all decisions of the Board of Directors shall have the consent of not less than six persons before they can be carried out.

The Director-General and the Assistant Director-General shall jointly manage the affairs of the Board of Directors, and they shall jointly sign all the documents of the Board.

In the absence of either the Director-General or the Assistant Director-General, their respective Governments may appoint another Director to officiate as the Director-General or the Assistant Director-General (in the case of the Director-General, by one of the Chinese Directors, and in that of the Assistant Director-General, by one of the Russian Directors).

(7) The Railway shall establish a Board of Auditors to be composed of five persons, namely, three Russian Auditors, who shall be appointed by the Union of Soviet Socialist Republics, two Chinese Auditors, who shall be appointed by China.

The Chairman of the Board of Auditors shall be elected from among the Chinese Auditors.

(8) The Railway shall have a Manager, who shall be a national of the Union of Soviet Socialist Republics, and two Assistant Managers, one to be a national of the Republic of China.

The said officers shall be appointed by the Board of Directors and such appointments shall be confirmed by their respective Governments.

The rights and duties of the Manager and the Assistant Managers shall be defined by the Board of Directors.

(9) The Chiefs and Assistant Chiefs of the various departments of the Railway shall be appointed by the Board of Directors.

If the Chief of a department is a national of the Union of Soviet Socialist Republics, the Assistant Chief of that department shall be a national of the Republic of China, and if the Chief of a department is a national of the Republic of China, the Assistant Chief of that department shall be a national of the Union of Soviet Socialist Republics.

(10) The employment of persons in the various departments of the Railway shall be in accordance with the principle of equal representation between the nationals of the Union of Soviet Republics and those of the Republic of China.

(Note :—In carrying out the principle of equal representation, the normal course of life and activities of the Railway shall in no case be interrupted or injured, that is to say, the employment of the people of both nationalities shall be based in accordance with experience, personal qualifications and fitness of the applicants).

(11) With the exception of the estimates and budgets as provided in Section XII of Article 1 of the present agreement, all other matters on which the Board of Directors cannot reach an agreement, shall be referred to the Governments of the Contracting Parties for a just and amicable settlement.

(12) The Board of Directors shall present the estimates and budgets of the Railway to a joint meeting of the Board of Directors and the Board of Auditors for consideration and approval.

(13) All the net profits of the Railway shall be held by the Board of Directors and shall not be used pending a final settlement, in a joint Commission, of the question of its distribution between the two Contracting Parties.

(14) The Board of Directors shall make a complete revision, as soon as possible, of the statutes of the Chinese Eastern Railway Company approved on December 4, 1896, by the Tsarist Government in accordance with the present Agreement and not later than four months from the date of the constitution of the Board of Directors.

Pending their revision, the aforesaid statutes, insofar as they do not conflict with the present Agreement and do not prejudice the rights of sovereignty of the Republic of China, shall continue to be observed.

(15) As soon as the conditions of the redemption by China of the Chinese Eastern Railway are settled by both Contracting Parties, or as soon as the Railway reverts to China upon the expiration of the time-limit as stipulated in Section II of Article 1 of the present Agreement, all parts of this Agreement concerning the same shall cease to have effect.

Article II—Navigation

The Governments of the two Contracting Parties agree to settle, on the basis of equality, reciprocity and the respect of each other's sovereignty, the question relating to the navigation of all kinds of their vessels on those parts of the rivers, lakes, and other bodies of water, which are common to their respective borders, the details of this question to be regulated in a Commission of the two Contracting Parties within two months from the date of signing the present Agreement.

In view of the extensive freight and passenger interests of the Union of Soviet Socialist Republics on the River Sungari up to and including Harbin, and the extensive freight and passenger interests of China on the lower Amur River into the sea, both Contracting Parties agree, on the basis of equality and reciprocity, to take up, the questions of securing the said interests in the said Commission.

Article III—Boundaries

The Governments of the two Contracting Parties agree to redemarcate their boundaries through a Commission to be organised by both Parties, and, pending such redemarcation, to maintain the present boundaries.

Article IV—Tariff and Trade Agreement

The Governments of the two Contracting Parties agree to draw up a Customs Tariff and conclude a Commercial Treaty in a Commission to be organised by the said Parties on the basis of equality and reciprocity.

Article V—Propaganda

The Governments of the two Contracting Parties mutually pledge themselves not to permit within their respective territories the existence and/or activities of any organisations or groups whose aim is to struggle by acts of violence against Government of either Contracting Party.

The Governments of the two Contracting Parties further pledge themselves not to engage in propaganada directed against the political and social systems of either Contracting Party.

Article VI—Commissions

The Commissions as provided in the Article of this Agreement shall commence their work within one month from the date of signing this Agreement, and shall complete their work as soon as possible and not later than six months. This does not apply to those Commissions, whose time-limits have been specified in the respective Articles of this Agreement.

Article VII

The present Agreement shall come into effect from the date of signature.

In witness whereof, the respective plenipotentiaries have signed the present Agreement in duplicate in the Russian, Chinese and English languages, and have affixed thereto their seals.

In case of dispute, the English text shall be accepted as the standard.

Done at the City of Mukden this Day of One Thousand Nine Hundred and Twenty-four, which is the Day of the Month of the Thirteenth Year of the Republic of China.

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BUREAU OF ECONOMIC INFORMATION

Pericle F. Chieri

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

上海仁記路拾六號

BOMBAY'S COTTON INDUSTRY

By George Bronson Rea

A GREASY DEAL

SHALL BRITAIN STAND ALONE?

THE RED MENACE TO ASIA

WANHSIEN

TELEPHONE RECONSTRUCTION IN TOKYO AND YOKOHAMA

SHANGHAI-NANKING LINE

Vol. XXII | September, 1926 | No. 9

Shanghai-Nanking Line

THE Shanghai-Nanking Railway is a line which brings into communication several important and populous Towns and Cities of Kiangsu Province, and forms one of the links—it may be said the first link—in the railway chain connecting the old with the new world by way of the great Trans-Siberian route.

Woosung Branch

The branch line from Shanghai to Woosung, 16 kilometres in length, has the distinction of being the first railway to be built in China. It was opened as a narrow gauge line so long ago as 1876, and ran successfully for some months, until native opposition proved too strong, and to avoid trouble it had to be closed. It was reopened later, on the understanding that the Government would take it over from the proprietors, but immediately the purchase was completed the line was abandoned, all the materials were taken up, and, together with the engines and rolling-stock, shipped to Formosa.

Main Line

The present Railway between these two places is of standard gauge, and was completed in 1898.

With regard to the main line from Shanghai to Nanking, a preliminary agreement for the acquisition of a loan for the construction of the railway was signed on May 13, 1898 in Shanghai by His Excellency Sheng Kung-pao (then Sheng Hsuan-huai), the Director-General of the Imperial Chinese Railway Administration, and Messrs. Jardine, Matheson & Company, and the Hongkong and Shanghai Banking Corporation, as Joint Agents representing the British and Chinese Corporation.

Four-and-a-half years elapsed before an Imperial Decree was issued, under the authority of which a final Agreement was executed by the parties named on the 9th day of July, 1903. This document provided for the issue of a sterling loan for an amount not exceeding £3,250,000 secured by Imperial Chinese Bonds, with the railway as first mortgage security. The price agreed upon for the loan was ninety per centum of the nominal value of the bonds, which bear interest at the rate of five per cent. per annum on their nominal value. The duration of the loan was fixed at 50 years, commencing from the date of the ratification of the Agreement, but provisions are included under certain conditions for the redemption of the loan after 12½ years, and at par after 25 years.

The amount of the loan was based on the preliminary surveys and estimates which had been prepared by the Consulting Engineers, the late Sir John Wolfe Barry, the late Mr. Gabriel James Morrison, and Mr. A. J. Barry, M. Inst. C.E. It included provision for payment of interest out of Capital during construction, Taels, 1,000,000 representing the agreed purchase price of the existing Shanghai-Woosung Line, and the sum of 250,000 for the acquisition of land by the Chinese Administration for a double line of railway for the whole distance, and for the construction and equipment, as economically as possible, in accordance with the best modern system, of the line of railway from Shanghai to Nanking.

In the meantime, a staff of Engineers had been engaged in England and the Summer of 1904 saw the permanent surveys and estimates completed, constructional work being commenced in the following Autumn.

Considerable delays were experienced in the initial stages, particularly in the acquisition of the necessary lands, but matters in this respect improved in the Spring of 1905, and on April 25 of that year the ceremony of cutting the first sod was performed by H.E. Sheng Hsuan-huai at Shanghai. In place of the then existing swamp there now stands a commodious station with extensive sidings, warehouses, and other accommodation, the main building being of handsome architectural design.

Work on the section of line from Shanghai to Wusih, a distance of 128 kilometres, was first taken in hand together with some of the heavier work on the Chinkiang-Nanking section, including the tunnel at and the deep cuttings in the vicinity of Chinkiang.

The Head Office and North Station in Shanghai

Where the Shanghai-Nanking and Shanghai-Hangchow-Ningpo Railways Meet

The preparatory examination of the country had revealed the fact that to avoid interference with the almost countless graves and houses would absolutely ruin the general alignment, and consequently render nugatory all ultimate prospects of economical operation and fast running. It was wisely decided, therefore, to lay out the longest straights possible, not only for the sake of directness but also with a view to reducing first cost of construction and future cost of maintenance and operation ; but slight deviations were made at certain places to avoid interference with Ancestral Halls, Tombs and Monuments.

Gradients and Curves

The benefit of such a policy will be readily conceived when it is stated that the ruling gradient is 1 in 200 of which, however, there is only 9 kilometres, and no fewer than 206 kilometres of the line are easier than 1 in 1,000. Of curves there are 59 between Shanghai and Nanking, with an aggregate length of 32 kilometres only. The sharpest curves are 3 deg. but there are only two of these, totalling 1,275 metres in length.

From Shanghai to Tanyang, a distance of 212 kilometres, the line crosses highly cultivated land of the Yangtse Valley, intersected with innumerable canals and creeks, and no other part of China, perhaps, is it possible to obtain a better conception of the agricultural resources of the vast republic. After leaving the latter city, the contour changes, and the line traverses an undulating and rising country until it reaches a ridge or water shed at kilometre 234; whence it descends on easy gradients, through heavy cuttings and a tunnel through the fort Hill to Chinkiang.

From Chinkiang the alignment follows the foot of the hills as far as Lungtan, thus avoiding the outer country which is subject to periodical inundations.

The terminus at Nanking, a distance of 312 kilometres from Shanghai, is on the south bank of the Yangtse River. The site prior to the advent of the railway was low swampy ground subject to annual inundations, and a great deal of filling had to be done.

Bridges and Culverts

Quite a feature of the line from an engineering point of view is the number of bridges and culverts which were rendered necessary by the numerous waterways which had to be crossed. There are no fewer than 303 bridges and 405 culverts between Shanghai and Nanking.

Tunnel at Chinkiang

The only tunnel on the Railway is situated at Chinkiang. The length from face to face is 402 metres, and provision was made for the laying of a double line of rails.

Endeavors were made to avoid a tunnel altogether, but it was proved conclusively that it was quite impossible otherwise to approach the city of Chinkiang except on a back shunt, the additional cost of which would more than have exceeded the cost of the tunnel apart from other more permanent objections.

It is worthy of record that the whole of the excavation and brickwork in the tunnel was carried out by Chinese labor, under European supervision, and during the construction not one single fatal accident occurred, this, we believe, being quite an exception in tunnel work, even where trained workmen are available.

Earthworks

Earthworks generally, presented little difficulty, except at kilometres 96 where the embankment had to be laid across a marsh continually under water, and at Nanking, as previously mentioned.

Permanent Way

Permanent way consists of 85-lb. flat footed steel rails 36-ft. long. The main line sleepers are of Jarrah 9-ft. by 10-in. by 5-in. spaced 14 to a 36-ft. rail. The sleepers of sidings are of the same wood, 8-ft. 9-in. by 9-in. by 5-in. spaced at 3-ft. centres.

Ballast

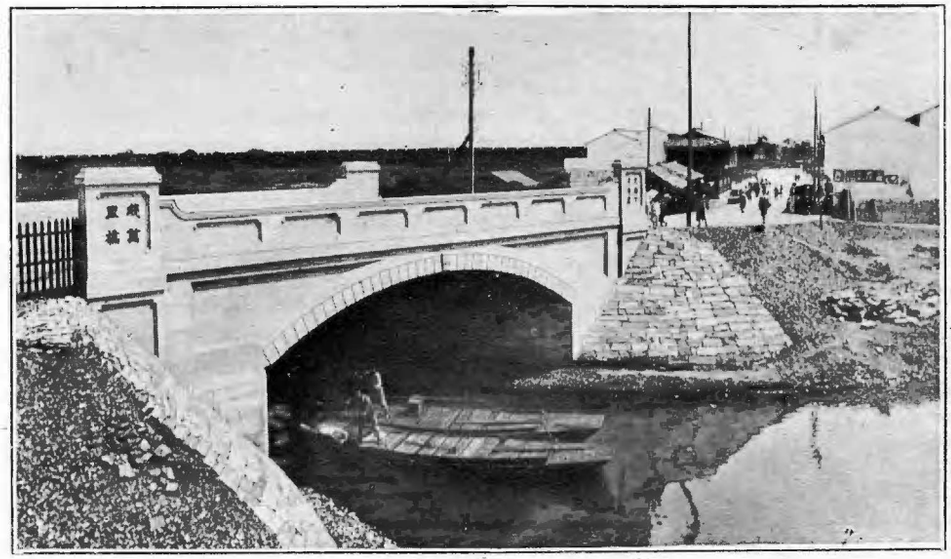
The line is ballasted throughout with bottom ballast of stones of 12-in. by 6-in. by 8-in. hand packed ; the top ballast consisting of stones broken to pass a 2-in. ring.

Telegraphs

By agreement with the Imperial Chinese Telegraph Administration the main line of posts and wires to Nanking was constructed by that Administration in the latter part of the year 1905 and early in 1906, the railway paying a proportionate cost of the total according to the number of wires. Five years later, however, the Railway erected a separate line of posts for their own wires.

The telegraph instruments used are open-circuit Morse inkwriters P.O. galvanometers, 4-line lightning conductors, and 4-line commutators, the batteries being Leclanche.

The Tunnel at Chinkiang



The Bridge at Soochow

Constructional Materials

To obtain suitable materials for the construction of the railway was a difficult task. As much as possible was obtained locally, though this was chiefly confined to earth, sand, stone, granite and bricks. In carrying out the work every possible effort was made to standardise details and working parts.

Construction of the railway was carried out departmentally, under the supervision of an Executive Engineer, with Assistant Engineers in charge of sub-divisions. The greater part of the work was let to Chinese contractors at scheduled rates, and the erection of the bridges was carried out entirely by Chinese labor under European supervision.

Locomotive and Carriage Shops

The locomotive erecting and carriage building workshops are situated at Woosung, about eight miles from Shanghai, on the left bank of the Whangpoo River, where the Railway possesses extensive water frontage.

The erecting shop has four lines of pits, and one through road for materials. Adjoining this are the machine, smith, and boiler shops, the power house and the boiler house. The machine shop is equipped with modern machinery electrically driven. The foundry has an area of 3,200 sq. ft. In addition there is a saw-mill, a carriage repair and a paint shop, carriage building shop and the usual stores. Two 20-ton electrically-driven cranes traverse the entire length of the erecting boiler and machine shops, and an 18-ton travelling crane is provided in the carriage repair shop. The offices of the Locomotive Superintendent and his staff, and a well fitted Laboratory, adjoin the shops.

Stations and Facilities

There are six passenger stations on the Woosung branch line. Ample warehouse accommodation and facilities have been provided at Woosung on the river front adjoining the Railway workshops for dealing with ocean shipment cargo. Between Shanghai and Nanking there are 42 stations, of which 30 are crossing stations, and a brief description of the principal ones follows :

The station at Shanghai-North is one of some pretensions. There is a spacious booking hall, refreshment and waiting rooms, and extensive offices in which is conducted the administration, and management of the railway. Perhaps one of the first things to strike the observant passenger is the extent of the covered circulating area, which is much appreciated by the Chinese passengers. The station was enlarged and remodelled in December, 1916, to provide for the advent of the Shanghai-Hangchow-Ningpo Railway trains.

Woosung line trains are accommodated on the east side of the station, where separate booking offices and waiting rooms, with a platform having direct access to the roadway, have been provided.

There are five main line platforms. Four of these form bays, with middle roads for the release of engines. The fifth has a through road to the Woosung branch.

Fourth Class or Coolie passengers are kept separate from the other classes as far as possible, and the booking offices for these are situated on the west side of the main station adjoining, but quite distinct from the baggage offices. The simplest design possible was adopted for the baggage offices, as indeed, for all the arrangements for the comfort and convenience of passengers.

Shanghai-North Main Line signal box is situated a short distance away from the ends of the platforms, and contains the electric staff instruments and the levers for operating signals controlling Shanghai-Nanking Railway and Shanghai-Hangchow-Ningpo Railway trains. All the signals are interlocked and are electrically lighted.

Along the western side of the passenger station and adjoining the public road, is an extensive godown (warehouse), capable of accommodating 144 thirty-ton wagon loads.

A locomotive running shed is situated on the extreme west of the station, and has accommodation for 18 main line engines. There is a machine shop attached for executing minor repairs. On the opposite side of the two main lines are four cast-iron water tanks of 10,000 gallons capacity. An additional shed on similar lines has been provided for the accommodation of Shanghai-Hangchow-Ningpo Railway engines.

Between the engine shed and the carriage shed is the electric power house, including boiler and engine house. The Penman Lancashire Boilers supply steam to two 85 K.W. compound Belliss engines running at 425 r.p.m. each, direct coupled to an E.C.C. compound wound interpole dynamo generating at a pressure of 440 to 460 volts.

The whole of the approach roads, offices, platforms and signals at Shanghai-North and the Goods Depot at Markham Road are illuminated by electricity generated here.

Nearly 3 kilometres from Shanghai-North is Markham Road Goods station, which may be termed the rail Goods Depot for the Treaty Port of Shanghai. It is situated on the Soochow Creek which runs through the heart of the International Settlement, and has two docks alongside which are extensive godowns and sidings for dealing with the traffic of both the Shanghai-Nanking and the Shanghai-Hangchow-Ningpo Railways.

At Soochow the railway has rail access to the Grand Canal, and a fair goods traffic is dealt with. Before the 1911 Revolution, Soochow was an official centre of considerable importance.

The Entrance to the North Station

The Woosung Locomotive Shops

Wusih has made rapid strides within the last decade. It is the centre of the great Silk Industry, the surrounding country being one immense mulberry plantation. Here the Railway has provided extensive godown and siding accommodation to cope with the general and special cocoon traffic. The latter, which is at its height in June, taxes the facilities of the railway to the utmost.

Changchow, a great trading centre, it little more than half way to Nanking. Changchow is the hub of the line in the night, and is the principal engine-changing station. There is a large engine shed with facilities for minor repairs, and the usual coaling and watering facilities. A fair goods and livestock traffic is dealt with, for which siding and godown accommodation have been provided.

Chinkiang is a Treaty Port on the Southern Bank of the Yangtze. A branch line runs from the station to the Bund. The changing condition of the river here is a matter of grave concern to the railway along with Steamship Companies, whose boats make Chinkiang a port of call on their journeys to and from Hankow. Notwithstanding the disabilities, however, a vary large traffic is handled here by the railway.

Nanking-Ferry is a goods depot and passenger station, situated on the south bank of the Yangtze River, with a large passenger pontoon, a wet dock and godowns and other requisites for the efficient handling of large quantities of goods.

It is at this station that connection is made with the Tientsin-Pukow Railway for travellers to and from the North and Europe. The ferry steamer waits at the pontoon directly adjoining the platforms, and is able to leave with passengers and baggage 15 minutes after the arrival of the Limited Express train from Shanghai. This is a vital point in the service, which brings Shanghai within 36 hours of Peking and before the War—16 days of London.

The question of the provision of a train ferry between Nanking and Pukow has been before the management for the last few years. Such a ferry would avoid the present break in the journey necessitating transhipment of goods, with consequent loss of time and leakages which now take place, and would render possible the completion of

Another View of the Woosung Shops

the journey to and from the North in the same compartment in which one started his journey from Shanghai or Peking. Whilst it is not actually impossible to construct a tunnel under, or a bridge over the Yangtse, the river bed is of such a nature that the cost would be enormous, and in the circumstances a train ferry appears to be a more satisfactory solution. Nanking (Hsiakwan) is the present terminus of the Railway. Besides a considerable passenger traffic, a large volume of goods traffic passes through the adjoining goods depot. Large Engine and Carriage sheds are conveniently situated near the terminus. A connection has been made at this station with the Nanking City Railway.

Types of Locomotives

There are several types of locomotives in use on the railway. All the locomotives are of British build. The "A" "B," and "E" classes were obtained from the North British Locomotive Company, Ltd. which Company is also responsible for two of the "C" class engines, the remainder of this class having been built by Messrs. Robert Stephenson & Company. The "F" class engines are exclusively of Messrs. Kerr Stuart & Company's build.

The "E" class engines, shipped out from England eleven years ago, are reserved for hauling the "up" and "down" Through Limited Expresses, which form connection with the services of the Northern railways. These last-named engines, which by the way are fitted with "Robinson" superheaters, are doing very good work.

The maxim of the management so far as goods traffic is concerned is "full loads, and quick despatch," and the "B" class engine meets the heavy demands which have been put upon it for dealing with this traffic.

The "C" class is a type well suited for the fast and local passenger services, and is a very capable engine. The bulk of the work of hauling the passenger trains falls on these engines.

Steam Travelling Crane

To deal with heavy lifts of general traffic, and also for use with the breakdown train, the Railway have recently acquired a steam travelling crane of a lifting capacity of 36 tons.

Coaching Stock

The coaching stock is of the four-wheeled bogie type on underframes 68-ft. long. The cars are entered at the vestibule ends, and there is through corridor communication from end to end of each train. The Janney coupler has been adopted and the Westinghouse brake, with improved triple valves, has been fitted to all cars.

The passenger rolling-stock is equipped on the "Stone" patent system of electric train lighting, and it is worthy of record that the Shanghai-Nanking Railway was the first railway in China to adopt electricity as the illuminent in the whole of its passenger stock. The trains are heated by steam from the engine in winter, and electric fans are installed in first class coaches for use in the summer. Restaurant cars are run on all express and fast trains, and the night expresses also include sleeping cars.

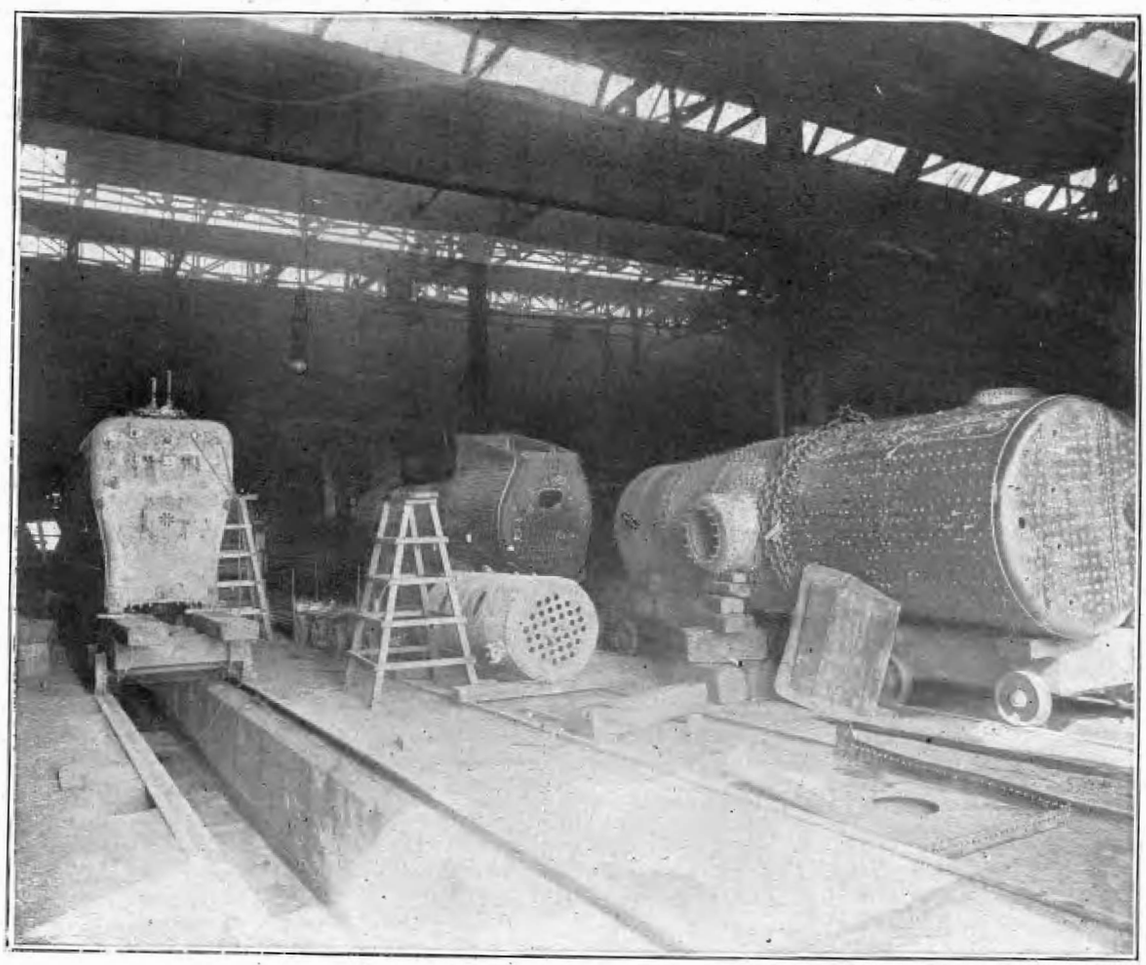
Goods Cars

Goods cars are all of large capacity, and are constructed of steel throughout. The majority consist of: (1) all-steel covered bogie vehicles on 40-ft. and 38-ft. under-frames of 40 and 30 tons capacity respectively; (2) medium-sized 4-wheeled bogie open wagons on 38-ft. under-frames, with a carrying capacity of 35 tons; (3) all-steel 4-wheel cars on 22-ft. 6-in. under-frames, 21 tons capacity; (4) all-steel bogie brake-vans on 38-ft. under-frames with covered accommodation for a load of 15 tons; (5) wagons on 38-ft. under-frames for special purposes such as livestock, and (6) tank wagons for the conveyance of oil in bulk.

The greater proportion of the goods traffic emanates from the districts served by the Tientsin-Pukow Railway and lines in connection therewith, and is transhipped over the Yangtse River from the terminus of that railway at Pukow to the Shanghai-Nanking Railway dock at Nanking-Ferry. The management have taken advantage of the fact that the traffic offers in bulk by providing vehicles of large capacity. It may be mentioned that the railway does not possess a single goods wagon, open or covered, with a less capacity than 15 tons. All goods stock is fitted with the Westinghouse brake, which ensures much safer and faster running than would be possible with unbraked vehicles.

System of Working and Train Control

The main line is worked on the electric staff system and all train operating arrangements are centralized in a Train Control Office recently provided at Shanghai-North. The majority of the goods trains are run in the night which enabels a much better utilization of the line and stock to be made.



Boilers in the Woosung Shops

Safety First Campaign

A Safety First Campaign was commenced in 1920, and has achieved excellent results. An "Accident Pamphlet" supplementary to the General Rule book was issued in 1920, containing necessary rules and instructions in a readily available form.

Passenger Fares

On and from January 1, 1921, the Passenger Fares were revised and as far as possible the following basis rate per kilometre was observed:

	1st Class	2nd Class	3rd Class	4th Class
Cents per kilometre ..	3	1.5	.75	.50

Owing to the severe water competition which the Railway have to face along the whole of their system, the utter impossibility of fixing all the fares upon the arbitrary basis of a definite number of cents a kilometre for each class of accommodation was recognised, and therefore, in deciding upon further moderate increases in the fares which came into operation on December 1, 1922, each particular pair of stations was dealt with separately, having regard to the elements of competition and other factors applying thereto.

Goods Rates

Goods Rates are divided into six classes, and apply to Car Load, Metric ton, and 50 kilogramme consignments. These rates are based on the tapering system.

Whilst the Railway is beset with competition by water, the traffic has increased by leaps and bounds, Chinese merchants are more and more realising that " time is money " and appreciate the rapid, easy and safe means of transit afforded by the Railway. Rates for the transport of merchandise by train bear favourable comparison with the charges for conveyance by boat.

Owners' Risk

That the methods adopted to ensure that safety of goods are satisfactory is proved by the fact that practically the whole of the traffic is consigned at " Owners' Risk " rates and it is very exceptional that traffic is booked at " Railway Risk." Claims are practically non-existent.

At present, the Railway finds itself unable, with the existing rolling-stock, facilities and accommodation at its disposal, to deal with the vastly increased volumes of traffic awaiting conveyance to Shanghai and the stock is being worked to the absolute limit of its capacity. At no period in history, perhaps, has there been such a promise of unlimited commercial expansion in China as there is to-day. By virtue of its geographical position the Shanghai-Nanking Railway forms the gateway to Shanghai which, even now the biggest commercial port of the Republic, will in all probability become the greatest centre of world trade on the Western Pacific.

Through Booking

Arrangements have been in operation some time past for the through booking of passengers, baggage and parcels, between the principal stations on the Chinese Government Railways, and between the principal stations on the South Manchurian Chosen and Japanese Government Railways. With a view to encouraging tourist traffic from Foreign Countries to the Orient, tickets are issued at reduced rates for overland and circular tours by rail and steamer, detours and inter-changeable routes being included to suit tourists' requirements. The fact that the traffic has steadily increased shows that the facilites are approved by the travelling public.

Traffic School

All the staff who come into contact with the public are able to speak and write English. A school for the training of traffic employees was established at Shanghai in 1907 and was reorganised in 1915. Admission is gained by competitive examination. The school has a library and is fitted up with models of all the ordinary working appliances in daily use. A model railway track with electrically propelled locomotives, passenger coaches and points and signals complete, embracing three stations has also been installed. The fact that a large number of men who pass through this school are nor occupying positions of responsibility on the Railway proves its success.

Higher Grade Scheme for Engineers and Surveyors

There has also been in operation for some time a higher-grade scheme for the training of Engineers and Surveyors. If, after the examination, a candidate's qualifications are found to be satisfactory, he is admitted to the rank of Probationary Student Engineer, and after specified periods he may advance successively to the grade of Engineering Student, Junior Assistant Engineer, Senior Assistant Engineer or Junior Assistant Surveyor and Senior Assistant Surveyor. Promotion in each branch and grade is by examination.

Fire Brigade

Special attention has been given to the maintenance of Fire Brigades formed from the members of the staff, and the arrangements generally for dealing with outbreaks of fire are most satisfactory. The personnel comprises 155 officers and men.

Recreation Ground

The Railway has gone to a good deal of expense in providing recreation ground for their employees at Markham Road and Shanghai North. These grounds are well equipped for tennis, cricket, lawn bowls, etc.

New Vessel for Adriatic—Far Eastern Service

THE Stabilimento Tecnico Triestino have launched from their San Marco yard the motorship *Romolo* for the Lloyd Triestino.

She is to be employed on the company's service from the Adriatic to the Far East, together with the *Remo*, which is in course of construction. The motorships *Esquilino* and *Viminale* are at present maintaining this service.

The dimensions of the *Romolo* are as follows :—

Length 147.75 metres ; breadth, 18.90 metres ; depth, 10.65 metres ; 11,500 tons dead weight. She will have a speed of 13 knots an hour.

The vessel is of the double deck type. There is accommodation for 50 passengers amidships in large single-class and double-berth cabins. Also amidships are a promenade deck, verandah, smoking room and music room, as well as officer's cabins. The *Romolo* has six large hatches, served by 16 electric winches.

The propelling machinery will consist of two single-acting 4 stroke Burmeister and Wain type Diesel engines, which will develop 2,500 h.p. at 115 revolutions per minute. Each engine consists of six cylinders having a bore of 749 m.m. each and a stroke of 1,200 m.m. Both the deck and the engine auxiliaries, which are under construction at the Cerpelli Works at La Spezia, will be electrically driven.

After the launch the guests were invited to a dinner given by the Lloyd Triestino, during which Admiral Dentice di Frasso, president of the board of directors of the company, pointed out in his speech that the company intended to replace their old tonnage with up-to-date motorships, which he considered to be the best vessels with which to face the present shipping crisis, and which will ensure the predominance of the Italian flag in the East, following the old Italian traditions.

H. E. Signor Cremonesi, Governor of Rome, added a few words, and pointed out that giving the name of the founder of Rome to the new unit of the Lloyd Triestino was an augury for the success of the vessel.

Delivery of New Bank Line

Messrs. Harland and Wolff, Ltd., Govan, recently delivered the motor vessel *Speybank*, built to the order of Messrs. Andrew Weir and Co., to that firm after having undergone very successful trials on the Clyde.

The new vessel, which is 434-ft. long by 53-ft. 9-in. wide, by 37-ft. in depth, has a gross tonnage of about 5,200. She is of the shelter deck type, and is classed 100 A.I. at Lloyd's. The double bottom extends fore and aft, and is used for the carriage of oil fuel, fresh water, or water ballast. Seven bulkheads extend to the upper deck, and divide the vessel into five cargo holds, motor room and fore and after peaks. The holds are fitted with cargo hatches of ample size, which are worked by twelve of the builders' special steel derricks, each suitable for 5 ton lifts, and rigged in the best manner for the efficient handling of cargo. The derricks are attached to two steel pole masts and four derrick posts, and an additional heavy derrick is fitted at the after side of the foremast suitable for dealing with loads up to 25 tons.

The propelling machinery of the *Speybank* consists of two sets of Harland-Burmeister and Wain six-cylinder, four-cycle motors, with electrically driven auxiliaries.

R: 20/XI/26

Pevile A. Chien

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路拾六號

遠東時報

ALTRUISM versus HORSE SENSE

By George Bronson Rea

MAINTENANCE OF CHINA'S INTEGRITY IN MANCHURIA AND MONGOLIA

COLONIES FOR EVERYONE BUT JAPAN

WHERE IS JAPAN'S CAPITAL TO COME FROM?

JAPAN'S NEW POSITIVE STATE POLICY

UPLIFT OR TRADE

OH WHERE, OH WHERE IS THE CONSORTIUM

JAPANESE MACHINERY IN CHINA

Vol. XXII October, 1926 No. 10

SHANGHAI, PEKING, TOKYO AND MANILA

Hulan-Hailun Railway

SURVEYS are in progress along the route of the latest new railway in Manchuria, the Hu-Hai line. This title is formed of the two first syllables of the names of the two main cities to be connected, Hu-lan-chen and Hai-lun-sian. These towns are situated to the north of Harbin at a distance of 20 and 200 versts (a verst is three-fifths of a mile) respectively, and are usually romanised as Hulan and Hailun.

The new line will start at Soun-bei, which has been specially built for this purpose. This town lies at a distance of six versts from the Chinese Eastern Railway and is connected by a branch line with Metaizsi, a C. E. R. station near Harbin. The Hu-Hai will run from Soun-bei north to Hulan, Suihua and Hailun. In the future, it is hoped to continue it to Mergen or Nunkiang *via* Erkeshan. The total length would then be about 416 versts.

The terrain to be traversed by the new line is considered by the Chinese to be one of the most fertile regions in Manchuria. Even in old times, this was well known. Ruins of five old cities have been found in the valley of the Hulan river, along which the railway will run. These cities existed in the 10th century and traces of cultivation may still be found. When Manchuria was conquered by the troops of Genghis Khan in the 12th century, these towns were destroyed. Later, Chinese settlers entered into possession of certain tracts, and toward the end of the 17th century, the Manchus also began to take an interest in the development of their home land.

At that time, North Manchuria was mostly inhabited by Mongol and Tungus tribes, which did not recognise any outside authority. A new element, however, soon broke down this exclusiveness. This was the Russian settler, who penetrated the country from the Amur district, and gradually subjugated the small local tribes. As a result, North Manchuria acquired a great strategical importance for the Manchus Manchu troops were introduced, local tribes were brought to submission by armed force, and after order had been established the Manchus turned their attention against the Russians. The presence of troops created the demand for supplies for their maintenance. Military posts were created in the Hulan valley, and the entire population of Chinese refugees was registered and divided into sections. In addition to this, 80 Chinese farmer families were brought from China by the Government. Manchus were likewise made to work the land, each family receiving an area of 10 *shan*. (a *shan* equals 1.8 acres).

Chinese historians note that the movement of Chinese settlers to the regions of the Hulan river became more intense toward the middle of the 19th century. Yet such settlement was illegal. The Manchu government maintained a ban against the migration of Chinese outside the Great Wall. Yet the local authorities furtively encouraged the introduction of Chinese settlers, because of their industry and capabilities in agriculture. Thus, the Manchu owners of the land gradually relaxed their hold, and Chinese penetration became intense. The historians state that emigrants moved towards the Hulan river "like an ant-heap, or a bee-hive."

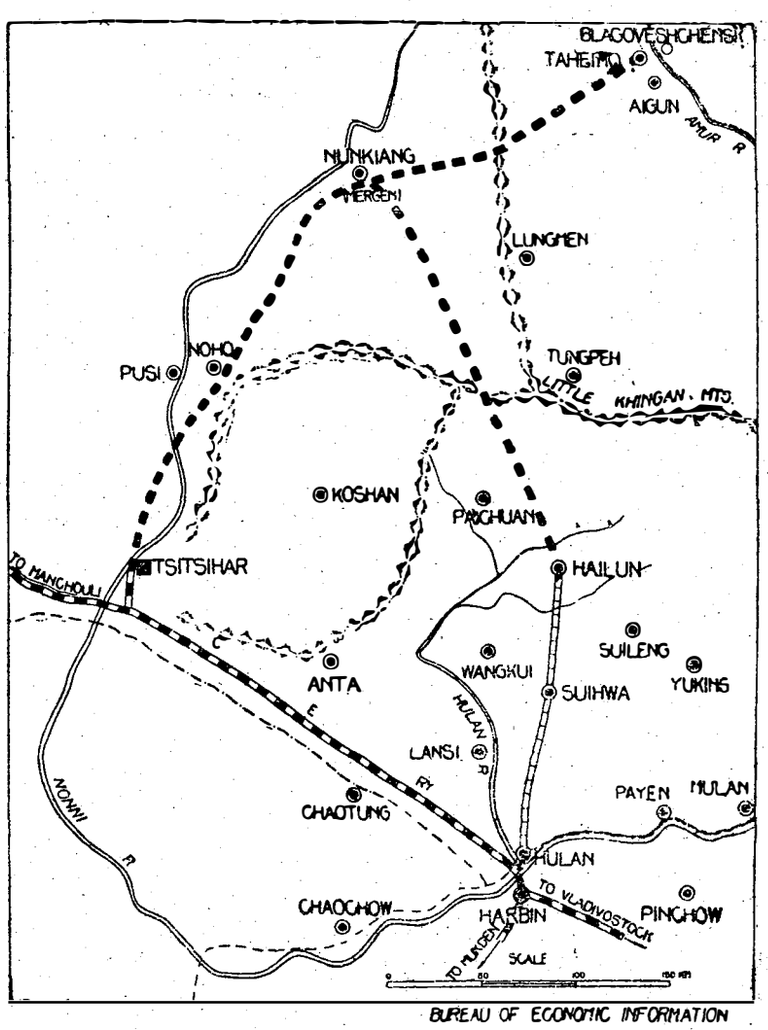
Then these migrations became legal in 1860 when two million *shan* of free land were divided into tracts in the regions of Hulan and Suihua. The influx of settlers increased, and beginning from 1878 a special Imperial order authorised Chinese women to cross the borders of China. Thus settlements began to assume a permanence which they had hitherto lacked.

The area available for colonization in the region of the Hulan river was insufficient to accommodate all these settlers, and the local authorities requested Imperial authorization to occupy lands belonging to the Mongolian Prince, Mannai-olt-gun. This was duly granted, bringing into use a considerable tract of territory. The authorities started a special bureau to look after settlers on Mongolian soil, and at this time the city of Hailun was built, and became the township for the new settlers.

Between 1905 and 1907 the old Manchu Government was completely abolished in north Manchuria in favor of a purely Chinese administration. Its first act was to start a colonization scheme in the Cherim district of Inner Mongolia. With all these settlements, particularly the impulse to colonization in the Hulan and Hailun territory, business began to develop, and the necessity of a railway line came to be realized for the export of products to the Sungari river ports and Harbin. The question was discussed in detail by the Tsitsihar Constitutional Assembly in 1909, when it was resolved to make arrangements for the formation of a promotion company. The Assembly insisted that the line should be built exclusively with Chinese capital, a problem which at that time was insoluble.

Then in 1910 Heilungkiang province entered into negotiations with local Chinese financiers and business men. It was decided to build a narrow gauge railway similar to that in operation between the city of Tsitsihar and the Chinese Eastern Railway, but with rails of a heavier type. However, many difficulties, such as bridging and tunnelling work, had not been taken into consideration, and the estimates for costs were inadequate. Later, these latter were adjusted to Tls. 3,700,000, which it was hoped would help the promoters to build a railway having the same gauge as the Japanese railways. Capital was to be obtained from the local Chinese banks. In this scheme the participation of the Chinese Government to the extent of a million taels was depended upon, the balance to be subscribed by the public. The security mentioned was the Tsitsihar branch line.

Surveys were initiated in 1914 at the instance of the Ministry of Communications in Peking, but more difficulties arose, the principal of which was the signing in 1916 by the Government in Peking of a contract with the Russo-Asiatic Bank for a railway running from Harbin to Mergen, with branch lines from that city to Aigun and Tsitsihar. A sum of £5,000,000 at 5 per cent. interest was to be advanced by



Hulan-Hailun Railway

the bank to the Government at the end of the European War. This agreement stopped all activities by the local authorities. As for the Russo-Asiatic Bank, the conditions prevailing in Russia at the end of the War brought about the non-realisation of their contract. Construction work was again delayed indefinitely. However, the people of Heilungkiang province remained alive to the need of the railway, and in this interest they were supported by Gen. Wu Chun-hsing, Governor of Heilungkiang. He it was who undertook to organize financial support, which he succeeded in doing toward the end of 1925.

Construction of the line is now at last in progress. It is being built with Chinese capital exclusively. Fifty per cent. of the funds are being furnished by the Tsitsihar Provincial Bank, 30 per cent. by the provincial authorities, and 20 per cent. by public subscription. Participation of foreign engineers in construction work is limited to the purely technical side of the undertaking. Costs are estimated at $35,000 per verst of line, including all equipment and rolling stock. The gauge is to be standard, similar to that of the Chinese Government railways.

It is hoped to make the railway a paying proposition immediately after construction. In addition, the plan is to create a series of concurrent enterprises for the exploitation of the forest and mining resources of the central and western parts of the little Khingan range. The Economic Bureau of the Chinese Eastern Railway is responsible for the statement that these regions supply Harbin already with 20 million poods (a pood is 36 lb.) of freight by eart yearly. It is thought that the railway will be beneficial to the Chinese Eastern Railway in that freight coming down the Hu-Hai will be transferred to the Sounbei branch line of the Chinese Eastern Railway to Harbin. This seems to have been realized by the Chinese Eastern Railway, for a special tariff has been granted by that line for the transportation of building materials and equipment in connection with construction work on the Hu-Hai.

The prevailing estimate of the population in the area to be served by the new line is three million. These are now distributed over four million *shan* of territory. It will be seen, therefore, that the line will undoubtedly attract new settlers. Production from the best ground at present is about 63 poods of grain per *shan*, the average being about 52 poods. The whole region is at present raising 200 million poods of grain per year, and the surplus export is estimated at 60 million poods.

The average cost of transportation will probably be established at the rate of 2.4 cents along the whole line. In this case the gross operating income of the railway should be about $4,800,000. It is expected that the accretion of grain surplus will be 40 million poods, making a total of 100 million available for distribution. The western part of the railway will skirt the little Khingan, which is rich in minerals. The central and western parts are covered with forests, absolutely untouched as yet.

When traffic opens on the western district of the railway, the exploitation of coal and other minerals, as well as of the forest wealth, should be stimulated, thus providing additional freight to the Chinese Eastern Railway.

Cooling Water Barrages for Power Stations

In view of the great development throughout the world in the use of barrages for irrigation and hydroelectric work, it is worthy of note that this principle is now being applied to the ordinary steam-driven electric station so as to give an adequate reserve of cooling water, a subject which has received too little attention in the past, especially in view of the increased cost of cooling towers.

The general principle is to erect a dam in the river or other source of water supply, which raises the level behind and frequently forms something in the nature of a small reservoir of much greater width than the original river. On these lines millions of gallons of water can be stored up and used as required, the dam being fitted with sluice-gates, which are raised or lowered so as to keep the volume of the impounded water within any desired range. Typical of the latest modern practice in this field is the new Colenso electricity station at Maritzburg, South Africa, for the supply of current for the electrification of the Glencoe line now being undertaken by the South African Railways and Harbors Board. The Tugela River is the source of the cooling water, and a barrage is being erected to increase the reserve supply. For this a British engineering concern is supplying four steel sluice-gates 40-ft. wide by 7-ft. deep, two sluice-gates 10-ft. wide by 9-ft. deep, and two 32-in. by 48-in. deep, being of the latest free-roller pattern, such as are being fitted all over the world for irrigation and hydro-electric work.

These gates run up and down on a train of rollers, which, for the Colenso installation, will be of cast iron 6-in. in diameter and 6-in. long, machined with great accuracy to 0.002 inches, so that each roller takes its correct share of the weight, also being enclosed in a mild steel cage fixed in cast iron shrouded guides, so that the velocity of the water passing through the gates cannot cause any vibration. Further, the usual accessories are embodied in the way of rocking paths, staunching bars, and gunmetal joint faces, while the gates will be raised or lowered electrically, local, remote, and automatic control being all provided.

The level of the river will in this particular case normally be raised 7-ft., but the design is such that in an emergency even 35-ft. can be withstood, as the Tugela is liable to sudden rises. Again, if required, each gate can be raised by hand with one man only. The hoisting ropes are of galvanized steel wire of six strands, giving $1\frac{1}{8}$-in. overall diameter, and having a net breaking strain of 43 tons. A very good example of such plant in Great Britain is at the Kilmarnock Corporation Electricity Station, where the River Irvine is dammed back by a single very wide steel sluice gate, of 70-ft. span, which raises the level of the river about 7-ft., resulting in a very great increase in the cooling water reserve.

Railways in South Sumatra

Assistant Trade Commissioner C. P. Goodhue, Batavia, Java

IT has been proposed to extend the railway net of south Sumatra to the hinterland of Moeara Bliti (the highlands of the Palembang and Bencoolen Residencies), where agricultural development has been considerably handicapped by the lack of adequate transportation facilities. The provisional proposal was to construct a line from Padangoelaktanding to Moeara Klingi, enabling more economical overland transport from the agricultural area concerned to the latter point, whence transportation to Palembang is effected by paddle steamer along the Moesi River. It was intended to substitute this line later with a line to Lahat, affording through railway connection with Palembang.

Advantages and Proposed Route

This provisional scheme was considered because of the uncertainty which then prevailed regarding the remunerativeness of a connection with the main line. Further investigations, however, together with an improvement in local finances, has decided the Government to extend the line ending at Lahat to Loeboeklinggau in the agricultural area concerned. The advantage of this through connection is obvious, as the Moesi River is unnavigable during periods of drought beyond Moeara Lakitam, between Moeara Klingi and Palembang. Further, though the cost of transportation by steamer is much cheaper than by rail (being from 60 to 80 cents per picol), the cost of transport by motor truck (from Loeboeklinggau to Moeara Klingi) is so high that through transport by rail is considerably more economical.

The proposed line between Lahat and Tebingtinggi will run in the neighborhood of the public road now connecting the two places, but will be 66 kilometers long to the road's 77 kilometers. From Tebingtinggi the railroad will run to Moeara Bliti and thence to the village of Moeara Soeling, where it will branch westward along the Bliti Valley for about 10 kilometers, and then run direct to the terminus at Loeboeklinggau at the junction of the roads to Soeroelangoen and Djami and that leading to Bencoolen from Moeara Bliti. The cost of the construction is estimated at 15,000,000 florins, for which an appropriation of 1,000,000 florins has been made in the 1927 budget. The period required for construction will probably be four years.

Chinese Government and Provincial Railways Demand Open Hearth Steel

A FURTHER testimonial to the high regard in which Open Hearth Steel is held by the more advanced railway engineers in this country lies in the contracts that have recently been placed with American manufacturers for Open Hearth Steel rails and accessories.

These embrace the following railways and tonnages :—

The Hulan-Heilung Railway, approximately 9,000 tons, through Messrs. Suzuki & Company with the United States Steel Products Company.

Kirin-Tunhwa Railway, approximately 19,500 tons, through Messrs. Mitsubishi & Company, Ltd., with the United States Steel Products Co.

Kin Puku Railway, approximately 10,000 tons, through Messrs. Okura Trading Company, with the United States Steel Products Company.

Peking-Mukden Railway, approximately 18,000 tons, through Messrs. Andersen, Meyer & Company, Ltd., with the United States Steel Products Company.

With a new era of railway construction now dawning throughout China, it is significant to note that the superior quality of Open Hearth Steel is fast supplanting steel formerly produced by the Basic Bessemer Process, in all departments where the elements of durability, safety and uniform dependability are required.

The following is a translation of a paper issued by the Rombach Works of Westphalia, Germany, entitled " Siemens-Martin Steel as Material for Tee Rails and Grooved Rails," and is exceptionally interesting, particularly so as it originates from a country which is prolific in raw elements suitable for the production of Bessemer Steel.

The tendency to employ a higher quality for materials to be used can be observed since the last few years in the whole field of engineering. The reason for this development is due on the one hand to the fact that loads and working stresses applied to materials of construction have increased, and on the other hand a more economical operation is looked for.

For quite a while it has been decided to increase the strength of steel castings and steel forgings for the different purposes ; and lately the practice has also been started of using materials in building construction of higher physical strength, and this tendency more recently is especially noticeable in the whole field of transportation.

Accordingly, it seems entirely reasonable that Government (steam) railways as well as street railways, because of the use of heavier rolling stock and, later, the increase in traffic density, should also in the case of rails look for a material of correspondingly higher quality which will in all respects meet these severer conditions.

Under these conditions, and also in the interests of safety, it is very important which quality of steel is to be used for the rails, and particularly for grooved rails, which will meet these conditions and insure the longest possible life.

A statement which the United States Steel Products Company has circulated deals with new recommendations concerning special specifications for steel rails. This publication shows that in America during the year 1907, 3,380,025 tons of rails were furnished in Bessemer steel, and 252,704 tons in open-hearth steel ; whereas in the year 1922 only 23,317 tons of Bessemer steel rails as against 2,033,000 tons open-hearth rails were placed in track.

This furnished sufficient evidence that in America the best results have been obtained with the open-hearth steel as material for rails.

We produce in our works open-hearth material exclusively, and have always claimed that open-hearth steel is the best steel for rails. This fact is best demonstrated, in the first place, by statistics on Tee Rails furnished by us in the years 1891 to 1912 for the Prussian State Railways. In this period of 21 years, and with a total quantity of 135,736 tons of rails furnished, only 73 tons had to be replaced, which represents a percentage 0.05378. In the same period no other German rail mill could show such a low percentage of replacement. We believe that this favourable result is principally due to the fact that we manufactured the State Railway rails from open-hearth steel exclusively.

Not only for State Railway rails has the open-hearth proved superior, but also for grooved rails in street railway tracks. This is evident because lately the most important street railway companies, in our as well as foreign countries, have expressed a preference for open-hearth steel rails.

Also representatives of switch manufacturers who are buying rails for their fabrication, have continually stated that the great difference between rails of open-hearth steel and Bessemer steel in their operations, such as planing, cutting, drilling, etc., is quite obvious, and demonstrates itself through the fact that rails made from open-hearth steel shows a more homogeneous and cleaner structure as compared with basic Bessemer rails, the latter also showing frequent breaks, blow-holes, segregation, etc.

In spite of the attempt made lately to claim that Basic Bessemer steel is equal in quality to open-hearth for rail material, the opinion of the railway Administration is practically almost unanimous that with the long years of experience in their operations, the incontrovertible conviction has been reached that open-hearth steel, both for the Tee Rails and also for grooved rails, has undoubtedly gained the preference over basic Bessemer steel.

In studying the process of manufacture of open-hearth steel and basic steel, it is easy to draw the conclusion why open-hearth steel is superior to basic Bessemer steel. In order to elucidate this, a few explanations are given below.

Physically, rail steel represents a mixture of chemical compounds, namely, the iron carbon alloy, carbide of iron, or cementite, manganese carbon alloy, manganese carbide, manganese phosphides, manganese sulphide, and a solution of salicon and various gases in iron. Most of the above mentioned constituents are present in the form of minute crystals in the rail steel, and are held together by cohesion. The strength of the rail steel is equivalent to the combined effective strength of all the individual crystals. With similar chemical composition and heat treatment of the steel, this physical strength increases with the decrease of the phosphorus and sulphur contents, as well as other injurious impurities contained in the steel.

By far the hardest of the above mentioned constituents, which decides the resistance to wear of the rail, is the carbide of iron, or cementite. This compound is one of the hardest materials in existence. The more cementite present in the rail steel, the greater will be its durability and resistance to abrasion. An increase of cementite in the rail steel, however, is only possible, without injuring the toughness of the steel, under the following conditions :

1. So-called impurities, such as phosphorus and sulphur compounds, as well as slag inclusions, must be reduced to a minimum.

2. Great care must be taken to produce steel which has the least amount of gas in solution.

In order to meet the first condition, to keep the impurities in the steel (phosphorus and sulphur compounds and slag inclusions) at a minimum, it is necessary to permit the chemical reactions to take place by effecting the greatest possible surface contact between the bath of steel and the refining slag, and by maintaining a gentle boil as long as possible.

In comparing the open-hearth process and the basic Bessemer process in regard to these conditions necessary for the refining of the product, we have the following :

1. The reaction surface between bath and slag in the open-hearth process is many times that which is effective in the basic Bessemer process.

2. The open-hearth steel bath is exposed to the purifying action of the slag during refining 6 to 7 hours. During this time all chemical reactions are taking place, especially dephosphorization and the desulphurization of the bath to such an extent that when the steel is tapped, an almost perfect chemical equilibrium can be obtained between the refined bath and the highly basic slag. With the basic Bessemer process this reaction takes place in about twenty minutes,

or in one eighteenth of the time during which open-hearth steel is refined and finished. The rephosphorization, which can hardly be avoided in the basic Bessemer process before pouring, is proof that at the finish of the heat the chemical equilibrium between slag and bath, which is the principal condition for the production of quality steel, has not been obtained.

3. During the working of the heat the steel bath in the open-hearth furnace is kept quietly boiling by ore and other additions. Towards the end of the process and with the completion of the chemical reactions, this boiling diminishes, and all, even small particles of slag and other impurities which were suspended in the steel bath pass into the slag. In the basic Bessemer process, slag and steel are brought into intimate contact with each other on account of the very violent reaction which takes place between the oxygen contained in the blast and the steel bath. The particles of slag which are thereby carried into the steel have no time later on to rise to the surface, and will be present to a large degree in the finished material which, in this case, is the rail of basic Bessemer steel. They naturally produce in the rail a dangerous condition, and are liable to have disagreeable consequences in service; and they always affect the physical properties of the basic Bessemer steel. In comparing the open-hearth process with the basic Bessemer process there are, therefore, five points to be presented, which insure a decidedly superior quality for the open-hearth steel.

1. Even with the use of very poor scrap the impurities in an open-hearth charge in the pig and scrap process amount to only a fraction of the impurities which have to be removed from the bath in the basic Bessemer process.

2. In the open-hearth process the surface contact for chemical reaction between slag and bath is much greater than with the basic Bessemer process, and correspondingly there is also a better refinement of the steel.

3. The time for chemical reactions during the melting of a charge in the open-hearth furnace is much longer than in the basic Bessemer process, and correspondingly the resultant product is cleaner.

4. The absorption of small particles of slag in the bath is avoided by the open-hearth process, and there even takes place an elimination of the non-metallic inclusions from the steel bath into the slag during the working of the charge. The nature of the basic Bessemer process has inherent danger of forcing minute particles of slag into the bath, where they remain and are the cause for an impure and unsafe material for service.

5. The deoxidation of the steel bath can only be effective when such deoxidizing conditions are continued for a longer period, and this can be maintained in the open-hearth process for hours. During this time the effect of deoxidation can be controlled by concurrently taking tests from the furnace which are submitted to an exhaustive physical examination and in that way a uniform steel can always be produced.

In the basic Bessemer process the deoxidation is carried out as well as possible in a few minutes. It is, therefore, principally because control of its effect by examining tests does not take place, more or less complete, resulting in a heterogeneous material, as is well-known by the user of basic Bessemer steel.

By a study of the given comparison it will be evident, even to those who are not metallurgists, why a continuous metallurgical, physical and chemical control of the steel made in an open-hearth furnace offers a more certain assurance of superior quality, as compared with basic Bessemer steel, in regard to purity, uniformity and desired chemical composition.

In practice this is also well-known. Materials for motive power construction which are subject to even more severe service than a rail (for instance, tires, wheels, axles, springs and driving parts), are to-day produced exclusively from open-hearth steel because basic Bessemer steel, on account of its inferior, heterogeneous composition cannot meet the conditions which are required for such parts to insure safety and resistance to wear.

Comparative investigation of the physical properties of basic Bessemer rails and open-hearth rails based on the principle of mass statistics, show the following in general:

1. With equal physical strength, the open-hearth rail has greater toughness and greater resistance to wear than the basic Bessemer rail.

2. With equal ductility, the open-hearth has far greater resistance to wear, higher impact resistance and greater hardness than the basic Bessemer rail.

3. With equal hardness, the open-hearth rail has greater toughness and greater resistance to wear than the basic Bessemer rail.

New Steel Cars of The Hanshin Electric Railway Co., Ltd.

At present 20 steel cars of the Hanshin Electric Railway Company are in operation between Osaka and Kobe, and an additional number of the cars of similar type which the Company placed orders last year with the four works, namely, the Osaka Iron Works, Fuji-Nagata Shipbuilding Yard, Tanaka Car Manufacturing Company and the Kawaski Dockyard for its manufacture has recently been completed.

Construction of the Car and its Equipment.

The Body of the Car.

The whole length, 45-ft.-10-in. Width, 7-ft.-7-in.

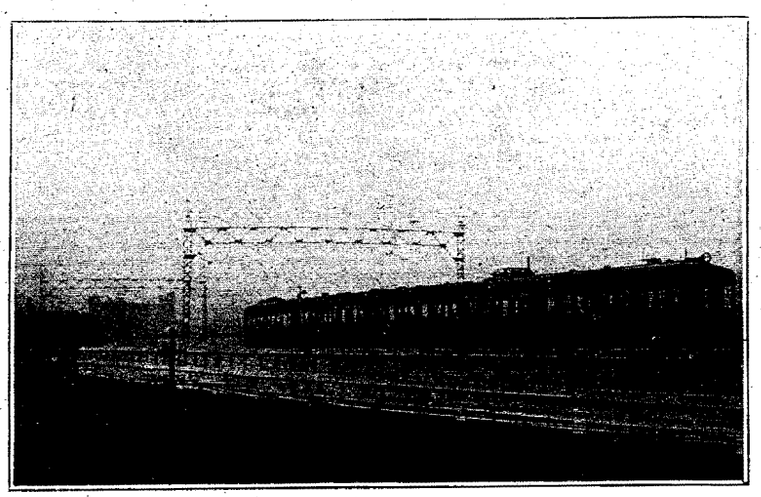
Length of compartment 39-ft.-10-in. Width of compartment, 6-ft.-10½-in.

Height of compartment, 7-ft.-10-in. Weight, 20.98 Eng. Ton.

The height from the surface of rail to the floor of compartment 3-ft.-10-in.

Seating accommodation for 90 persons.

The cars are each installed with four TDK 513 Type, 65 H.P. ...pped field motors supplied by the Toyo Denki Seizo Kabushiki ...isha.



The Hankyu Elevated Railway, between Osaka and Juso, Using All Steel Cars

The bearing is SKF roller bearing. Controller is from Shibaura Engineering Works, Co. This is RPC Type motor controller which is of same type with the G.E.'s MK Type motor controller.

As the braking arrangement, the following are equipped with: WH 7 H.P. Compressed air motor, 12-in. by 12-in. brake cylinder, AMM triple valve and M-24 brake valve. For the above, the reservoir pipe system is adopted.

American automatic slack adjusters are used for the whole of the Company's cars, as they were found very effective for the high speed service now operated by them. As shown in Fig. 2, the principal parts of the adjuster is as follows:

1.—brake cylinder 2.—adjuster cylinder
3.—adjuster pipe 4.—adjuster cross-head
5.—adjuster screw 6.—ratchet nut

The body of the car is of same type with that of Baldwin 75-25-A. The result of a trial run proved to be excellent. The highest speed of the car is 50 miles per hour, and it will not take more than 46 minutes to run the section between Osaka and Kobe.

Engineering Notes

Cavite Sewage System.—A modern sewer and drainage system is to be constructed in Cavite, P.I. to be paid for by the issue of provincial bonds amounting to P156,000.

At present, lack of proper drainage facilities causes damage both to street and fields. The former plan of obliging each individual to construct his own septic well and drainage canals was found inadvisable by the district engineer.

State Housing Plan.—The Japanese government is now drawing up plans to settle the housing problem of Tokyo, Osaka, Kyoto, Kobe, Yokohama, and Nagoya, at a cost of Y.37,000,000 during the next 10 years. The scheme will be introduced in the coming session of the Diet and urged as one of the most important and imminent questions of the country and the Home Office will ask for approximately Y.1,200,000, from the Finance Office to cover the expenditures for the next fiscal year.

The housing problem will be settled by the municipal authorities, which are to obtain the government's subsidies annually in order to carry out the plan, according to the act which provides that unhealthy and rotten houses will be removed from the city or the slum quarters improved in order to improve general health conditions.

New Power Plant, Japan.—Following an understanding with the Ministry of Railways regarding the sphere of riparian rights. The Shin-etsu Electric Power Company, a subsidiary of the Tokyo Electric Light Company, has voted to raise funds to erect a new plant along the River Shinano at a cost of about $90,000,000 spread over a period of five years. The paid up capital of Y,32,000,000 is to be increased by Y.12,500,000 (a quarter of Y.50,000,000 to be nominally increased) to a total of Y.44,500,000. Then debentures are to be sold gradually to cover the remaining amount.

Work is to be started the early part of next year.

New Taxi Co., Osaka :—A scheme is being materialized by the managers of the inter-urban electric railway companies to operate city buses connecting all the inter-urban tram terminals.

Mr. I. Okada, of the Nankai Line is the chairman of the committee to study and outline the plan. It is understood that, if the plan be carried out, the company to be formed jointly by the inter-urban electric railway companies will be able to cut down the present fare by almost one-half. The new company has yet to decide whether or not it will buy the Osaka Motorbus Company. It is understood that the taxi company when organized will run cars especially between the terminal stations in Osaka, so that it will be easier for passengers to pass through the city from one suburban line to another.

Osaka's New Broadway.—Work on Osaka's new Broadway leading from Umeda Station to Namba was started on October 8 with a suitable ceremony.

The road, 144 feet wide, will have a 20 feet central section for tramways with 18 feet on both sides of it for motorcars, and another belt of 18 feet for cart traffic, and pavements of 18 feet. Trees will be planted in four rows between the pavements, the belts for high-speed cars and carts. Electric light of artistic design will likewise be installed along the whole route.

Its construction between Umeda Station and Umeda Shimmichi Crossing is to be finished within the present year, and the other sections leading to Namba Station by 1933.

The removal of the houses, improvement of the tramway tracks and underground work in connection with drainage and water mains in the first section have already been done.

Osaka City Motorbus Scheme.—It is expected that there will be much opposition to the plan of operating motorbuses in Osaka by the Municipal Office when it comes before the City Assembly. The plan was drawn up by Mr. Kimura, chief of the traffic section of the Municipal Office, and recommends the use of Woolsley cars to seat 18 passengers. These cars are manufactured by the Ishikawajima Works of Tokyo and their purchasers obtain a bonus from the War Office.

Paper Mill Extensions, Japan.—The Oji Paper Mill, Fuji Paper Mill and Karafuto Kogyo Kaisha, the three largest Japanese mills, are planning to increase equipment and production within three years. If these plans are realized, the capitalization of the Fuji interests will be increased to Y.77,000,000 and annual production to 450,000,000 pounds, that of the Oji interests to Y.60,000,000 with the annual production of 400,000,000 pounds and that of the Karafuto Kogyo to Y.70,000,000 with an annual production of 200,000,000 pounds.

Flour Mills Won't Pay Freights on Shipments.—The Nisshin and Japan flour mills have announced that hereafter the railway freight of seven sen on each bag of flour must be borne by the consignee. They have further agreed not to sell for less than Y.4.20 a sack.

As a result of this announcement, the spot price, quoted at Y.4.01 at the beginning of the month, has jumped to Y.4.15. October delivery has gone up to Y.4.13 and December delivery to Y.4.15. The tone of the market is firm.

After November 25, according to the mills, which have merged, they will no longer pay the five sen rebate on each bag.

The merger of these two companies is expected to have a favorable reaction on the market. It has already steadied prices.

The Tsuru brand of the Nisshin Flour Mill, in the past, has been exported at a price five sen below that of the Japan Mill's Take brand.

The companies have now decided to export the cheaper flour and keep the better brand for home consumption. The combined production of the mills available for export is about 12,000,000 bags a year. Present exports amount to about 5,000,000 a year.

Railway Warehousing, Japan.—The Japanese authorities have decided to erect large warehouses near Nagoya under control of the Nagoya Railway Bureau during the next fiscal year. Land covering 1,900 tsubo will be purchased at Shin-Aichi near Nagoya. The building cost is Y.2,000,000. The expense of erecting other warehouses in other parts of Japan for five years beginning the next fiscal year is Y.10,300,000.

Bureau	Erection	Expenses
Tokyo	Shiodome and Sumida	Y.3,600,000
Kobe	Kobe, Osaka, Sakurajima	3,200,000
Nagoya	Shin-Aichi	2,000,000
Moji	Tairi	1,500,000
Total		10,300,000

S.M.R. Hotels.—The South Manchuria Railway Company will separate its hotel business and establish an independent company with a capitalization of Y.8,000,000, holding all the stock in its own hands.

Its railway hotels at Dairen, Hoshigaura, Port Arthur, Mukden and Antung represent an investment of about Y.6,000,000 and as they have an annual combined net operating loss of about Y.100,000, it is considered likely that the new company will be subsidized to that extent by the S. M. R.

This step is in line with the policy of the railway to make all its subsidiary enterprises legally independent. Gas and ceramics were separated last year and this spring electricity was divorced from the parent concern.

Government Coal Mining Combine, Korea.—A large coal mine combine in Korea is being planned by the Government General of Korea. The demand for anthracite coal has increased in recent years, and, exports last year totaled 620,000 tons, of which 359,000 tons were anthracite. Many mine owners in the peninsula, however, either suspended operation or discontinued, due to depression. The

Korean Government authorities had believed it necessary to effect a combine among coal mine owners to develop the industry in Korea and then establish a large coal mining company under official auspices.

The authorities will open negotiations with the Mitsubishi, Yasukawa, Kuhara, Heijo Electric, Chosen Kokyo and a few other mine owners. About 130 mines in the South Heian district are to be combined at first, according to the plan. The combine will be extended later to about 70 mines in the North Kankyo district.

Rail Orders, Japan.—Columeta, the sales organization for the Arbed-Terres Rouges group, of Luxembourg, has been awarded the order for 10,000 tons of 100-pound steel rails on which the Imperial Government Railways asked bids on September 17. This second order for 100-pound rails, is to be used in replacing the present 75-pound sections between Tokyo and Kobe.

The I. G. R. is planning to replace within five years all the 60-pound sections now in use with 75-pound rail.

Bids are being asked for 55 miles of 100-pound steel rails, about 10,000 tons in all, including splice bars, for the Kinhean electric line, near Osaka.

All Steel Railway Cars, Japan.—The recent railway accident on the Imperial Japanese Railway near Hiroshima has influenced the Railway authorities to have all new passenger coaches built of steel and estimates have been submitted for the construction of 720 new steel coaches during the next fiscal year at a cost of Y.32,000,000. Out of 650 coaches built this year in Japanese car factories, 190 have been of steel. Although most of this work will be done at the Government Railway Shops, a large proportion of the orders will be distributed to the private car builders of Japan. These companies are now enjoying considerable prosperity from the orders for all-steel cars placed by the Manchurian and Chinese railways. The Japan Rolling Stock Company at Nagoya has already completed and delivered several thousand tons of these cars and is planning to extend its manufacturing capacity in order to handle a larger volume of orders.

New Fertilizer Factories, Japan.—The Japan Artificial Fertilizer Company will erect a new 25,000 ton nitrogen fertilizer factory in Sasano, on the Kurobe River. The same concern has also purchased the Osaka Alkali Company, which intends to reorganize as the Osaka Alkali Real Estate Company, at a capitalization of 500,000 yen.

The Mitsui Bussan Kaisha, the Mitsubishi Shoji Kaisha and the South Manchuria Railway Company are planning jointly to establish a large soda ash company in the Kwantung leased territory with a paid-in capitalization of 15,000,000 yen. The Kwantung Government is to grant a subsidy for the enterprise in the budget for the next fiscal year.

There are now two soda ash plants operating in Japan, the Asahi Glass and Soda Manufacturing Company and the Japan Soda Ash Manufacturing Company, but they find themselves at a disadvantage in competition with foreign soda ash, due to the high price of salt here. Salt is handled as a Government monopoly and these concerns have repeatedly petitioned the Finance Ministry to reduce the price for them. Kwantung products last year were exempted from import tariffs into Japan.

Tokyo Electric Light Extension.—The Tokyo Electric Light Company, plans to increase its output by 1,000,000 new lights by the end of this year.

During the first seven months of the year, 562,000 new lights were installed increasing the total to approximately 5,500,000, and the new extensions will raise this to about 6,000,000.

At an average Y.7 per light, the company estimates an increased revenue of Y.7,000,000 a year.

Yalu Hydro-Electric Scheme.—A hydro-electric power plant with a 2,000,000 kilowatt capacity, to be erected with a capital of Y.200,000,000 somewhere along the Yalu River, is the new project which Mr. Tadasaburo Yamamoto, a Japanese business man, and Mr. Takema Machino, adviser to Marshal Chang Tso-lin, are now planning to carry out. The project includes the erection of a plant for magnesium alloys.

I. J. R. Electrification Plans.—Plans for the hydro-electric plants of the Ministry of Railways have been announced for the next fiscal year. The new plants to be erected along the Shinano River will cost about Y.146,000,000 the work to be divided into four periods. The first, from 1927 to 1931, will include the construction of dams, reservoirs, aqueducts, sub-stations and high tension towers. The first three items, it is expected will cost about Y.32,000,000, the last two, Y.19,000,000. A capacity of 44,000 kilowatts is planned.

During the second period, from 1931 to 1934, the installation of the power plants with a capacity of 40,000 kilowatts will be carried out, at an estimated cost of Y.30,000,000.

The third and fourth periods, covering five years, and calling for Y.65,000,000 will be spent on connecting up power plants and electric systems and changing the character of the rolling stock. A bill embodying these points is to be submitted to the Imperial Diet at its next session.

Harbin Tramway Construction.—Construction work on the Harbin tramway began on July 29. It is expected that it will be completed in July next year. Materials have been supplied by Siemens (China) Co. while the principal contractor is the An Tai Co., who built the tramway in Peking.

The Harbin tramway is a joint enterprise of the provincial government and the merchants. An initial expenditure of $710,000 has been duly paid, but it is feared that the difficulty of raising the second instalment may cause an interruption of work.

Refrigerator Cars in China.—The first refrigerator car in China has recently been put in service on the Shanghai-Nanking Railway. This is one of the 21 refrigerator cars ordered from Belgium by the Ministry of Communications.

Nine of these cars are to be appropriated for use on the Tientsin-Pukow Line, five on the Shanghai-Nanking Line, four on the Peking-Mukden Line, and three on the Shanghai-Ningpo-Hangchow Line.

The cars have each a loading capacity of about 22 metric tons; empty weight is about 30 metric tons.

Three New Trust Companies in Japan.—The Finance Ministry has approved the establishment of the Konoike, the Kashima Trust and the Chugoku Trust Companies.

The Konoike Bank of Osaka, has purchased the Setsuyo Trust Company, capitalized at Y.1,000,000, and increased its capitalization to Y.20,000,000, renaming it the Konoike Trust Company. Baron Z. Konoike, president of the bank, becomes president of the new institution.

The Kashima Bank, Osaka, has taken over the interests of the Japan Hypothec Company, Tokyo, capitalized at Y.1,000,000, and the Mansei Trust Company, capitalized at Y.500,000, reorganizing them under the name of the Kashima Trust Company with a capitalization of Y.20,000,000. It will have its head office in Osaka and a branch in Tokyo. Mr. K. Hirooka, president of the bank, heads the new company.

The Chugoku Trust Company, capitalized at Y.5,000,000, has been formed by Mr. M. Ohara, a noted banker and business man of Okayama, and will have its head office in that city.

Minor trust companies in Osaka and Kobe are also discussing plans for an extensive merger.

Steam And Motor Boats on Yangtse Increase.—Steam and motor navigation has again increased by leaps and bounds on the Yangtze. The number of vessels which have navigated between Ichang and Chungking has risen from 43 during 1924 to 58 during 1925, and 10 new vessels are expected on the run in the near future.

The tendency of building smaller vessels, as foreshadowed in the 1924 Trade Report, has been maintained, and the majority are of such draught and tonnage that they can ply all the year round. Also, motor vessels are finding favor and oil burners are preferred to steamers. Of these latter, several are intended to be converted into vessels consuming liquid fuel, of which a steady supply at steady prices is obtainable, while local coal is neither dependable as regards supply, quality, or price.

In spite of the great increase in tonnage, freight rates have, on the whole, been maintained on a paying basis, even during the high-water season, when the smaller vessels were naturally handicapped by the advent and greater capacity of the summer fleet, and when unsettled conditions in Shanghai and locally affected freights adversely.—Chungking Customs Report, 1925.

Frank A. Chin

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

上海仁記路拾六號

GEORGE BRONSON REA
vs.
"THE JAPAN CHRONICLE"

JAPAN'S FIGHT AGAINST DISCRIMINATION

CHINESE OWNED RAILROADS OF MANCHURIA

OSAKA-KOBE STATE HIGHWAY

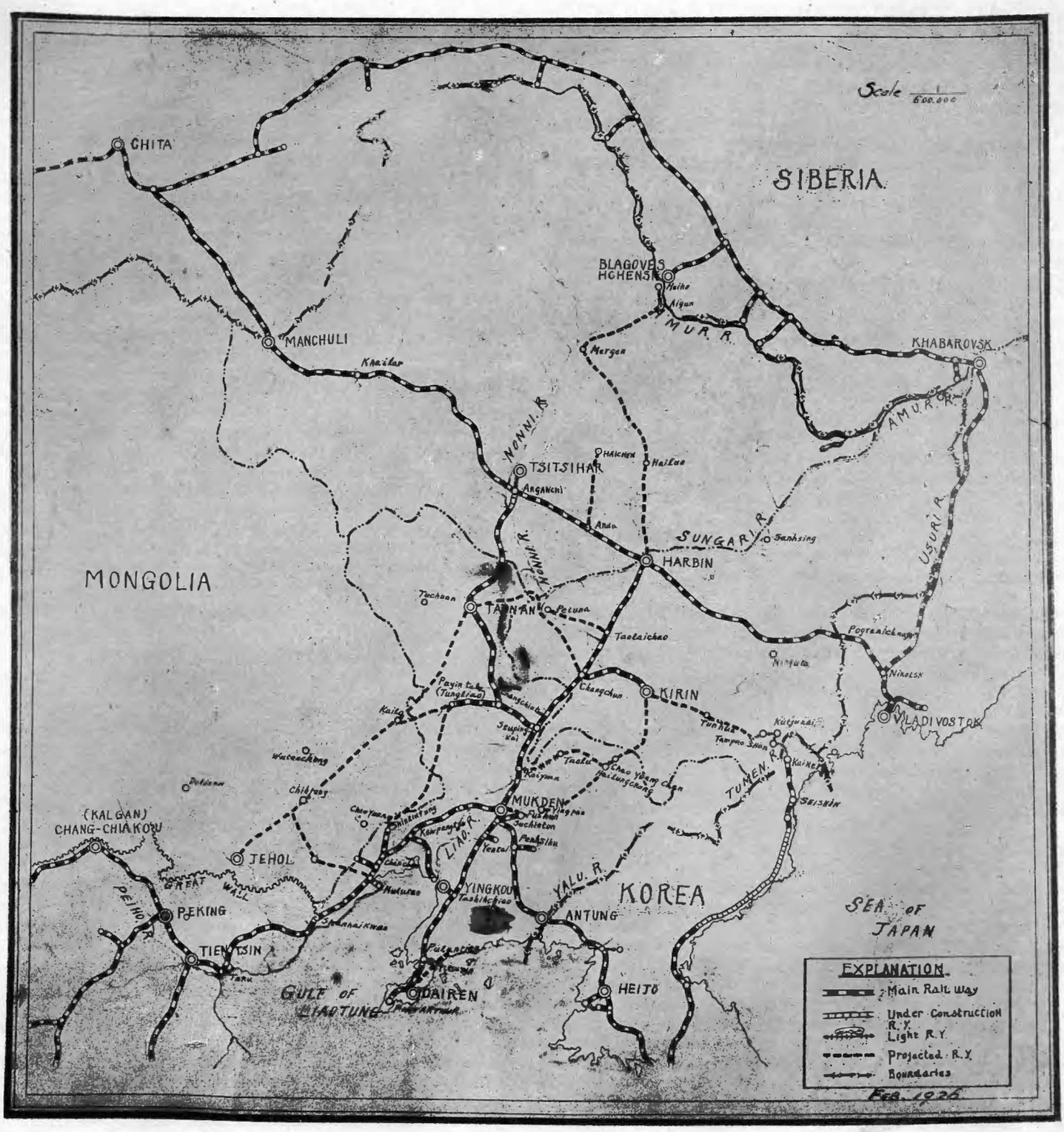
RECENT ADVANCES IN HIGH VOLTAGE SWITCHGEAR

Vol. XXII | November, 1926 | No. 11

The Chinese Owned Railroads of Manchuria

THE Chinese themselves are undertaking, and have definite plans for future construction of important railways in Manchuria, declares Civil Governor Mo Teh-hsueh, who, in addition to his duties as Civil Governor of Mukden, is also the head of the commission which has Manchurian railway affairs in hand. Mo took charge of his office about half a year ago, upon the resignation of Civil Governor Wang who abandoned a long and particularly successful career when Chang Tso-lin insisted on carrying on his campaigns south of the Great Wall.

General Mo expresses the belief that the extension of transportation facilities, both railways and cart roads, furnishes one of the most important keys to the further development of the Three Eastern Provinces. The projects which he outlines are particularly significant in that they emphasize the point that the Chinese are building and intend to build railways for themselves. Thus to the situation which has attracted almost exclusive attention abroad when Manchurian affairs have been considered, namely the rivalry between Russian and Japanese interests, is added a third



and most important factor, namely the rapidly growing control by Chinese of extensive railway systems, in connection with which must be considered also the extension of Chinese control in the Chinese Eastern Railway.

"The railway line which is now being built between Mukden and Hailungchen is the most purely Chinese railway line in existence," claimed Governor Mo, with much evident satisfaction, when seen at his yamen in Mukden the other day. "Of this sixty miles have already been built, and the entire distance of about 153 miles will be completed by March of next year. It is being built by Chinese engineers and by means of Chinese capital, a part thereof being furnished by the Mukden Government and the rest by private subscription."

This line traverses a rich section of territory, Hailungchen being a large town lying between Mukden and Kirin, the capital of the province by that name. Governor Mo added that the present undertaking is only a part of the larger scheme which contemplates the carrying on of the railway as far as Kirin.

From Kirin a railway is now being built as far as Tunhua, in an easterly direction. This undertaking is being carried on by contract for the Chinese by the South Manchuria Railway in accordance with an agreement with the Chinese Government, signed at Peking last year, and will, when completed, be under Chinese management. It was expected that this line would be completed by April, 1928, but it has recently been decided to shorten the route by the construction of four tunnels, of which two will be quite long, and this will involve a longer time for construction. Considerable divergence of opinion exists in Manchuria as to the direction in which further extension of this line should take from Tunhua, some believing that it will be most profitable to carry the line on towards Ninguta, a town north of Tunhua and not far distant from the Chinese Eastern Railway line, while others contend in favor of building in an easterly direction. This latter plan would enable the new line to connect with existing lines running from the Korean coast, and this plan has therefore been regarded by some observers as a Japanese strategic scheme, as it would provide a direct line from the Korean coast to Changchun. It is therefore interesting to note that Governor Mo believes that the Chinese should continue the line from Tunhua to the Tumen river, to which a railway already stretches from the Korean coast. This plan must, however, be regarded as one of the fairly indefinite future.

A very interesting project about which little or nothing has been said, involves the building of a railway from Taonan to Solon, an important town north-west of Taonan. Taonan was this year connected with Anganchi (Tsitsihar), a town on the Chinese-Eastern line, by a standard gauge railway. The projected line will go from Taonan in the direction of Hailar, a very important point on the C.E.R., north-west of Tsitsihar. Tsitsihar and Hailar are separated by the Khingan mountain range, and Solon lies just east of that range. A party of Chinese surveyors is now laying out the line as far as Solon, and Governor Mo stated definitely that construction of the road will begin as soon as the survey has been completed. This will be carried out by means of Chinese capital and by the Chinese themselves. The most important point in connection with this project lies in the fact that, according to Governor Mo, it is only a part of the main project, the second step of which will involve carrying on the line right to Hailar.

In this connection Governor Mo stated that the new line from Taonan to Anganchi must be carried on across the Chinese Eastern track to Tsitsihar. The Russians call their station at this point Tsitsihar, but, as a matter of fact, the real town of Tsitsihar, the capital of Heilungkiang (Amur) Province, lies some eighteen miles from the C.E.R. station and is connected therewith by a narrow-gauge railway belonging to the Chinese. The new road from Taonan has been built only to a point about four miles from the C.E.R. station, and the Russians have objected strenuously to the carrying on of this line northwards, across the C.E.R. tracks, to Tsitsihar proper. On the other hand, the Chinese wish to change the present narrow gauge road between Tsitsihar City and the C.E.R. track to a broad gauge line and to connect it with the newly built line from Taonan. Some months ago Governor Wu of Heilungkiang told the writer that he intended to have this plan carried out, with Russian consent, if possible, but "by all means," even if the Russians should continue to object. It is therefore interesting to note that Governor Mo is of the same opinion, emphasizing, as did Wu, that as Chinese will carry out this work, by means of Chinese capital, and on Chinese soil, there can hardly be room for valid objection.

Governor Mo also pointed to the work which is now being carried on by means of Chinese Government and private capital in building a standard gauge railway line from Hulan, across the Sungari River from Harbin, to Hailun, Ostroumoff, the former (White Russian) manager of the C.E.R. being the chief engineer. Trains are already running over a short part of this line. It is intended eventually to carry this road on in a north-westerly direction to Mergen where it is to join another projected line running from Tsitsihar to Aigun. The completion of these plans will thus bring about an all-Chinese railway running from Aigun through Taonan to Changchiatun, and on to Ssupingkai on the S.M.R. line. The developments beyond Hailun and Tsitsihar must, however, be regarded as fairly indefinite at present, though the Chinese have every intention of causing them to materialize as soon as they have the necessary funds.

Governor Mo also referred to another interesting project which is now about to be carried out, namely the building of a railway from Changchun to a point called Nungan. This town lies in the very rich region between Changchun and Taonan, of which Petuna is the center, and the project has specific interest in that it marks the actual beginning of a development which will carry a railway on through Petuna to Taonan, a scheme which was, in fact, included in the preliminary agreement arrived at between the Japanese banks and the Peking Government in June, 1918.

The Civil Governor stated that as this territory contained a number of prosperous towns, this project was regarded as very important, but its execution was somewhat complicated through the fact that the projected line would extend through two provinces, namely Fengtien and Kirin. Money was at present being raised in Kirin for building the portion of the line as far as Nungan, which lies between Changchun and Petuna, but is in Kirin. The construction of the remainder would be a matter for the future, he said.

Development of railways extending in westerly and northerly directions from the branch lines already built from the Peking-Mukden line were also taken up by Governor Mo. Building, he stated, was now in progress which would reach the rich coal mines at Paipiao (some of these are said to be owned by Chang Tso-lin) but the was no present intention of carrying on further northwards. This statement is rather important in that it seems to set at rest the rumors to the effect that the Chinese intended to carry on construction northwards until they connected with either Kailu, Payantala or Chengchiatun, adding possibly a direct line from Taonan to Payantala in case that point should be selected, which would revive the old dream of Willard Straight of a direct line from Aigun (on the Amur River, opposite Blagoveshensk) to Chinchou (on the Peking-Mukden line).

"The question as to whether future development in this region should take a northerly direction, that is, towards Payantala, Chengchiatun, or Kailu, or whether it should extend in a westerly direction, towards Jehol, is one of the far distant future," said Governor Mo, "as at present we have other schemes in mind which are of more pressing importance."

Among the railway questions now being discussed in Manchuria, general interest is concentrated to-day on the position of the Chinese vis-a-vis the Russians in respect to their respective interests in the Chinese Eastern Railway. As is generally known, the Chinese have during the past few months been making a very strong showing, lopping off one branch after another from the control of the Russians, notably the C.E.R. river fleet, administration of the C.E.R. schools, and the telegraph system, and the belief is fairly common that either this process may continue until the Chinese will seriatim obtain complete control of the entire system, or that they may take it over by one final action. Incidentally, the non-Chinese in North Manchuria, with the exception of the White Russians who are anxious to see the Soviet side ousted in any and all cases, and the Soviet Russians, who, of course, wish to remain in control, find it very hard to arrive at an opinion as to whether this would or would not be an unmixed blessing. Most foreigners would be pleased enough to see Soviet political influence, which centers in the C.E.R., removed, but, on the other hand, they feel that this desideratum might be offset, partly through the circumstance that the line might become ineffective under Chinese management, as have so many other railways in China, and partly because they fear that a dangerous precedent might be established. In other words, they think, if the Chinese succeed in ousting foreign interests in the case of the C.E.R., they may have their appetite whetted by such success to the point where

(Continued on page 535).

The old-fashioned cubicle, with separate tank circuit breakers can show positively no advantage over the semi-metalclad arrangement, which gives minimum capital cost installed, less and safer maintenance, and (on account of the design of the circuit breaker itself) a greater factor of safety in breaking circuit.

APPENDIX

Dimensional Comparison of Various Constructions

TABLE III.

Breaking Capacity of Circuit Breaker K.V.A.	Minimum Floor Space: sq. ft. Including Gangway Full Metalclad	Semi-Metalclad	Conventional Cubicle
150,000 ..	27.2	28.5	44
250,000 ..	27.5	33	51
350,000 ..	41	42.5	53
500,000 ..	72	61	86
750,000 ..	94	70	98

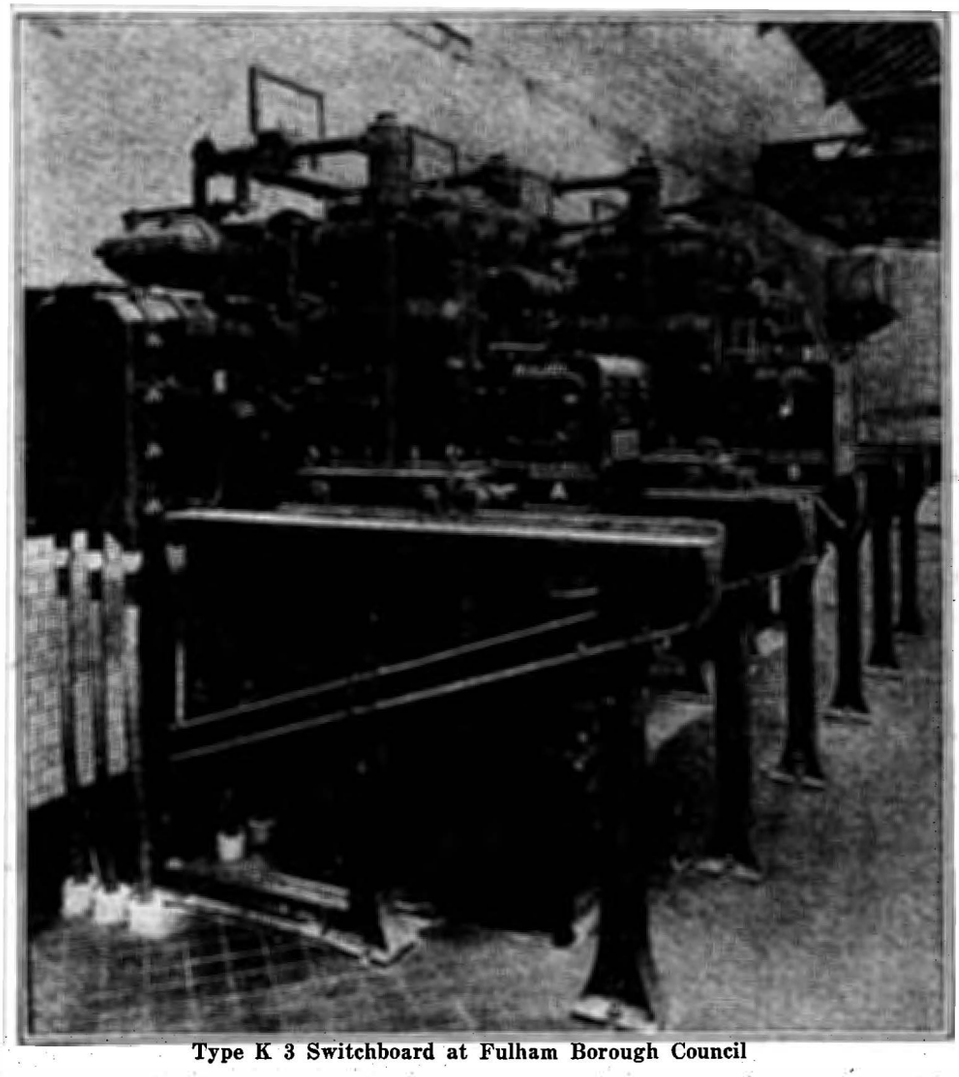
TABLE IV.

Breaking Capacity of Circuit Breaker K.V.A.	Minimum Room Capacity: cu. ft. Including Gangway Full Mtealclad	Semi-Metalclad	Conventional Cubicle
150,000 ..	190	310	470
250,000 ..	200	360	560
350,000 ..	340	490	600
500,000 ..	720	800	1,100
750,000 ..	1,040	1,000	1,430

TABLE V.

Breaking Capacity of Circuit Breaker K.V.A.	Cubic Contents of Concrete Work: cu. ft. Semi-Metalclad	Conventional Cubicle
150,000 ..	115	245
250,000 ..	135	285
350,000 ..	175	300
500,000 ..	240	530
750,000 ..	290	650

The above tables of approximate comparisons are all based on an average sized feeder circuit on 11,000 volts. It must be borne in mind that floor space occupied (Table III) is usually of greater importance than the cubic space occupied (Table IV), since in most cases the height of room is fixed by some apparatus other than the switchgear.



Type K 3 Switchboard at Fulham Borough Council

In regard to Table V, the cost of concrete cubicles, moulded in situ, generally varies directly with the overall dimensions of the structure. The actual cost varies considerably according to the method of construction, and the district in which the work is done. It is usually of the order of Y. 1.00 to Y.1.50 per cub. foot.

Chapei Electricity and Waterworks Co., Ltd.

Work has been started on the new plant of the Chapei Electricity and Waterworks Co., Ltd., at Dike Road, Military Road, Chapei, Shanghai. The new plant is being built on an area of 150 *mow*, and it is expected to be ready for operation by June, 1927. Its daily capacity in the beginning will be 10 million gallons and may be increased to 40 million gallons. Water will be drawn from the Whangpoo River instead of the Soochow Creek which is the present source of supply. The new plant will have (1) two coagulation basins, 12 rapid sand filters, and two chlorinators all of which will have the combined capacity of 10 million gallons, (2) one pump house to be equipped with a centrifugal pump driven by a motor with 1,000 kilowatt power and with a water pressure equivalent to 100 lbs. to the square inch at the works and 40 lbs. per square inch for hydrants, (3) five purified water reservoirs with a capacity of 957,000 gallons, (4) a water tower 95.5 feet high with a capacity of 170,000 gallons, and (5) water mains consisting of C. I. pipes, 36 inches in diameter, which will aggregate a total length of 7.5 miles and which will be connected with the existing distribution system. The cost of the new plant is estimated at $2,000,000. The company will contract for light and power from the Electricity Department of the Shanghai Municipal Council although plans are being made to build a power plant of its own in due time. When the new plant begins operation, the present works at 189 Heng Feng Road, Chapei, will be remodelled into a reservoir station. The company is capitalized at $4,000,000, and its general office is located at 441 Tatung Road.

The Chinese Owned Railroads of Manchuria

(Continued from page 515).

they may wish to try the experiment with respect to other foreign interests in other railway lines in China.

"We will get all we can," was Governor Mo's terse reply to the direct question as to whether China would seek complete control of the C.E.R. "On the other hand," he added, "we regard it as extremely important that the traffic of the road be in no way interfered with."

The building of good cart roads appears to be a favorite plan of Governor Mo. He pointed out that the development of Manchuria was being held back because inadequate roads prevented transportation, and that the construction of railway lines did not afford a completely effective solution of the problem. He hopes to bring about the construction of a number of roads, some of them leading to the railways, though not paralleling them, and some connecting important towns without any special relation to the railways. In the construction of such roads, he says, it is necessary to plow up the soil and then tamp it down, an effective process though it involves constant attention for several years. It is not practicable, for economic reason, to employ stone in such construction, but the new roads will nevertheless be a vast improvement over those which now exist.

Engineering Notes

Electric Light Company at Wuwei.—An electric light company to be known as the Chih Ming Electric Light Co. is being organised at Wuwei, Anhwei province.

Electric Light Company at Tungchow.—An electric light company known as Tung Kwang Electric Light Co., Ltd. is being organised at Tungchow, near Peking.

Electric Power Rice Mill at Tungshan, Amoy.—The gentry of Tungshan, an island near Amoy, Fukien province, propose to establish a modern rice mill with an electric power plant which will also supply current for city lighting. $100,000 is being raised to buy a plant from Shanghai.

Match Factory at Yangchow.—The buildings and machinery of the Yao Yang Match Factory at Yangchow, Kiangsu province, which was closed in 1925, have been leased to a Shanghai merchant. The factory will soon resume operations under new name and new management. It is located outside Chaokwan on the Canal.

Yung Feng Washing Soda Factory, Shanghai.—The Yung Feng Washing Soda Factory is being organized by Wu Hsin-yüan. It is capitalized at Tls. 3,000 and will be engaged in the manufacture of pure washing soda. Its factory is located at 3 Tê Hsiang Li, Tang Chia Wan, West Gate, Chinese City, Shanghai. The manager is Wu Hsin-yüan.

Hua Ta Factory, Shanghai.—The Hua Ta Factory, manufacturers of paper boxes, No. 44/6 Route Conty, Shanghai, has recently been enlarged. The company was organized in 1925. The factory employs 30 workers and in busy seasons 70 women workers. It has seven machines, all Chinese made, for the manufacture of paper boxes, especially cigarette packages, which are manufactured at the rate of 300,000 per day. The manager is Yu Ch'u-ch'ing.

Cotton Cloth Weaving at Anking.—There are at present 180-190 cotton cloth factories at Anking, capital of Anhwei province, equipped with over a thousand looms, mostly made of iron and operated by hand. About a tenth of them are wooden hand looms. These factories produce principally white cotton cloth which is in popular demand in the neighboring districts, while the finer variety of figured cloth consumed at Anking is imported from the outports. There are also about sixty cotton ribbon makers, each with two or three looms. Two or three agents of outport cotton yarn mills are supplying the weavers with cotton yarn.

Kiang Nan Paper Mill, Shanghai.—The Kiang Nan Paper Mill, Ltd. has recently been registered at the Ministry of Agriculture and Commerce. The company was organised in August, 1925, and the first meeting was held in December. Yu Ya-ching, formerly chairman of the General Chamber of Commerce, is one of the promoters. The company is capitalized at $400,000 at $20 a share. Construction of its factory in Tsao Kia Tu has been proceeding for several months, and a part of the plant is expected to be ready for operation by November. The plant will manufacture Chinese paper from rags and straws. It has three machines imported from Japan. The mill will not manufacture newsprint, as costs of production will not allow of competition with Swedish stock. It employs about 200 workers, and its daily output is estimated to be 12 tons. The office is at 32 Avenue Edward VII, Shanghai.

Ta Yi Cotton Mill, Kiangchow, Shansi.—The Ta Yi Cotton Mill, Kiangchow, Shansi province, has been organised by Li Chung-san with a capital of $600,000. The mill is to be equipped with 5,000 spindles to turn out yarns of 16 and 30 counts. Shansi is a cotton producing province; each of the districts in the south western section including Yungho, Yungtsi, Kuwo, Hungtung and Chaocheng, exports annually 110,000 bales to 180,000 bales (1 bale is 150 catties) to Tientsin and Hankow. But so far only one cotton mill is operated in the province, namely, the Chin Hwa Cotton Mill at Yutse.

Pao Feng Cloth Factory, Hankow.—The Pao Feng Cloth Factory, Chiaokow, Hankow, was started in 1925 with a capital of $300,000, having 240 looms each capable of turning out one piece of cloth a day, 3 drawing machines, and other equipment for spinning. It employs 200 men, 80 women, and 20 children. The director of the factory is Tang Shan-cha, and the manager Tan Tze-ching. Yarns of 18 and 20 counts from the Yung On Cotton Mill, Shanghai, are used for warp and those from the Sun Sin Cotton Mill, Hankow, for woof. Cloths turned out from these yarns are known as "fine" cloths, or *shihpu*, being finer than those turned out from yarns of 16 counts. One piece of this cloth contains about 2,400 warp threads, weighs 13 lb., and measures 40 yards in length and 3 feet and a half in width, and is sold under the trade mark "San-pao" at Tls. 7.1 to Tls. 7.8 per piece. Men weavers are paid 100-130 coppers per piece according to skill; female spinners 40-60 coppers a day, and child laborers 40-50 coppers a day, according to output. They work from 6 a.m. to mid-day, and from 1 p.m. to 7 p. m. There are no night shifts.

Tientsin-Paoti Motor Service.—The opening of a motor-bus service between Tientsin and Paoti, Chihli province, has been sanctioned by the Chihli Provincial Motor Service Administration and the service will be started in the immediate future with 10 motor cars. The ticket office is located at Erh Ma Lu, Hopei (Chinese city), Tientsin.

Wireless Telephone between Harbin and Mukden.—The long-distance wireless telephone service between Harbin and Mukden has been in successful operation since August. Extensions of the service to other large cities in Manchuria are planned.

Peking Wireless Administration.—The Peking Wireless Administration opened a business office at Tungchushihkow, outside Chienmen, on September 12 to facilitate the receiving and delivery of commercial messages, which are charged at the same rates as telegrams.

Shanghai-Nanking Railway.—The Shanghai-Nanking Railway has recently completed surveys west of Changchow with a view to building a branch line extending about 40 *li*. Three lines have been surveyed, namely (1) from Sinza Chen Station to Hsiao Ho K'ou, (2) from Pen Niu Station to Hei Mu Chiao and (3) from Pen Niu Station to Yin Sha. It has not been decided which line is to be built. The line proposed is for the purpose of facilitating the transportation of wheat and other agricultural products to the main line.

Radio Telephone Broadcasting Station in Harbin.—The Kellogg Switchboard and Supply Company, 12 Nanking Road, Shanghai, has signed a contract with the Mukden Government to erect a radio telephone broadcasting station in Harbin. This is the first contract to be let for a government broadcasting station in China. The power of the Harbin station will be 1,000 watts. Antennae are approximately 8,000 watts primary power. Two 140 feet galvanized steel towers of the self-supporting steel type will carry the antennae. All of the latest improvements used by the large American and European stations will be installed.

Shaohing-Tsaoao-Chenghsien Motor Road, Chekiang.—Chang Hsuan-chu, former Civil Governor of Chekiang, and other promoters are organising a company with a capital of $1,000,000 for the construction of a motor road from Shaohing to Chenghsien through Tsaoao. The company will be known as Shaohing-Tsaoao-Chenghsien Branch Motor Road Co., Ltd. The promoters have subscribed one-half of the fixed capital while the remainder is open to public subscription. The proposed route starts from Wuyunmen, which is the terminus of the Siaoshan-Shaothing Road, running eastward and passing through Kaofow, Fankiang, Taoyen, Chinkow, Tungkwan and Tsaoao, where it turns southward, passing through Haopa, Shangpu, Wangkiawei, Changkiafow, Sankai, Yunpu, Tsingfeng, Sienyen and Shanshutan to connect with the Chenghsien-Shanshutan Road.

The road passing through Shaohing and Chenghsien is a part of the trunk line of the Chekiang provincial highway connecting Hangchow, the capital city, with Futinghsien in Fukien province, passing through Siaoshan, Shaohing, Chenghsien, Sinchang, Tientai, Linghai, Hwangyen, Wenling, Yotsing, Yungkia, Juian and Pingyang, the total length being 897 *li*. The road from Hangchow to Shaohing is being built by the Provincial Highway Bureau, the Siaoshan-Shaohing section having been completed and opened to traffic last spring. The Kiangtow-Hushih section in Hangchow district, is being surveyed. The section from Chenghsien to Shanshutan is to be built by the Public Works Bureau, land on the route having been purchased last spring. But between Shanshutan and Shaohing, there is still a distance of over one hundred *li* devoid of any decent roads. It is this section that the new company proposes to build. With the construction of the Shaohing-Tsaoao-Chenghsien section one-third of the trunk line between Chekiang and Fukien provinces will be completed.

The Mingpo-Tsaoao section of the Shanghai-Hangchow-Ningpo Railway has been built as far as the east bank of the Tsaoao River. Between the town of Tsaoao on the west bank of the River and Shaohing city there are regular steam boat services. The Shaohing-Tsaoao-Chenghsien road will connect with the Siaoshan-Shaohing road on the west and is only separated by the Tsaoao River on the east from the Ningpo-Tsaoao section of the Shanghai-Hangchow-Ningpo Railway. Its completion will give much greater facilities to travellers between Hangchow and Ningpo than they enjoy at present. On the south, the new road will also establish connection with the Chenghsien-Shanshutan road, reaching Hohwatitow Chenghsien city. As Chenghsien and Sinchang are noted for their cocoons, tea, tobacco and other products, heavy passenger and freight traffic is expected on the new road.

Tobacco Growing in Manchuria.—Tobacco growing was originally introduced into Manchuria from the Philippine Islands through Japan and Korea. With the construction of the Chinese Eastern Railway, the suitability of the Manchurian soil for tobacco cultivation began to attract the attention of the Russians, and through official and private encouragement the industry in Manchuria has grown year by year. Manchurian tobacco is noted for its fine quality, and is well-known not only among the Chinese but also among the Russians and Japanese. But primitive methods of preparing leaves are still followed. After the leaves are picked, they are piled up in the field, covered with grass, and then gradually removed into cellars, where they are covered with mats till they turn into an orange yellow color. They are then taken out and bound in bundles with rope for drying on frames in sunshine. At night they are covered with grass mats to protect them against dew and frost. After being thoroughly dried, they are pressed and wrapped into bales for export. The success of this method of preparing tobacco leaves depends entirely on nature and great care is necessary.

The best tobacco in Manchuria is produced on the Upper Sungari River in Kirin province. While tobacco is grown extensively in the Sungari River valley, Omu, Piaoho, Kiaoho, Tunhwa, Kiapikow and Mopanshan are the best known and most important producing centers. Along the Chinese Eastern Railway, the districts of Ashiho, Pinchow, Maoerhshan and Tungpinhsien yield the best tobacco. A Russian estimate puts the annual production of tobacco in Kirin province at 1,350,000 poods. The product of the Upper Sungari River is shipped to Kirin city, which is the center for distributing Manchurian tobacco to Chihli and Shantung provinces through Changchun Mukden, Tientsin and Tsinan. The consumers of Manchurian tobacco in Chihli and Shantung provinces generally consider the Kirin product as being a finer product than that of the other two provinces, Fengtien and Heilungkiang. Kirin tobacco of the superior grade is for export, the inferior for local consumption. Although cigarette smoking is becoming more popular in Manchuria, the practice is only in vogue in the larger cities and towns. The country folk still use the old-fashioned Chinese pipe for smoking *kwantung*, or Manchurian pipe tobacco. Several brands of foreign cigarettes are manufactured from Kirin tobacco leaves.

As the Mongols living in regions on the Manchuria border also consume pipe tobacco, a portion of the Manchurian product along the Chinese Eastern Railway, amounting to about fifty thousand poods a year, is exported to Mongolia. According to experienced tobacco growers, tobacco, like grapes, thrives best in moderate climate. Cultivation of tobacco in rich grape-producing regions usually produces very good results.

More Motor Roads.—Construction of motor roads in Chekiang province is in rapid progress. The Hanghisen-Yuhang, Yuhang-Wukang, Hanghsien-Fuyang and Siaoshan-Shaohing roads are either partly or wholly completed and motor-bus services have already been started on these sections. The Keng-Ling (from Kenk-shanmen at Hanghsien to Lingpingchen) Motor-Bus Co. has extended the line to Haining and renamed the compnay Hanghsien-Haining Motor-Bus Co., Ltd. The building of this road has gone as far as Chiaoszu, and the remaining section will soon be completed. The whole line covers 63 *li*. Construction of the Yuhang-Wukang line will reach Mokanshan, a popular summer resort in Chekiang province, before the summer vacation this year.

Kalgan Wireless.—The wireless station at Kalgan, which has been transmitting commercial messages for a number of years, is encouraging the use of wireless by the public. Notifications have been issued to the effect that the Station will charge the same rates as the Telegraph Administration, with a free service for coding and decoding, and will transmit messages to Peking, Tientsin, Shanghai, Hankow, Paotowchen, Yunnanfu, Mukden, Harbin, Newchwang, Changchun, Tsitsihar, Chefoo, Tsingtao, Tsinan, Loyang and Foochow.

Railway Benefits.—The Ssupingkai-Taonanfu Railway had led to an increasing development of the north-western section of Fengtien province. In spite of the poor sandy soil which covers much of this region, settlers continue to pour in from districts further south. The two cities of Tung-liao-hsien and Taonanfu have grown considerably in size and importance within the last couple of years. To obviate the lack of sufficient water in the latter city, artesian wells are being sunk, several of them within the houses, to prevent freezing during the cold season.

Wireless Rates.—The wireless station in Tientsin is now able to communicate with the stations at Harbin and Yunnanfu, and will accept private messages for transmission to these places at the following rates:—Harbin, ordinary message, 12 cents per word, code or foreign language message, 18 cents; Yunnanfu, ordinary message, 18 cents, code or foreign language message, 27 cents. Messages are accepted at the head office of the Tientsin Telephone Administration at Chakow.

Harbor Works in Dutch East Indies.—An interdepartmental Committee appointed by the Government of the Netherlands to consider the question of the construction of a new deepwater harbor at Samarang (Java) has issued its report and has made the following four recommendations: (1) that the building of a new deepwater harbor at Samarang is both necessary and possible: levies must be raised on those using the port until it can pay its way. (2) The present is considered a very suitable time for carrying out the work, which should be started forthwith. (3) The continuance of the system of payment which has been used by the authorities and the Government for the last two years. (4) The existing form of management should be retained for the exploitation of the new port.

Sun Sing Manufacturing Co., Ltd., Shanghai.—The Sun Sing Manufacturing Co., Ltd., E. 670 Burkill Road, Shanghai, has been organized. It is capitalized at $20,000 at $50 a share. $12,000 has been paid up. The company will manufacture plain and fancy handkerchiefs. It has 16 machines, 4 of which are used for embroidering. Its manager is John K. Chien. The company was officially opened on September 27.

Increased Demand for Motor Cars.—Motor cars for the first time took their place in the tables as a "million tael" commodity and deserve some comment. During the year 1,063 cars, valued at Hk. Tls. 1,364,922, were imported. A considerable number of the cars were for military use, but it is impossible to say exactly how many, as buying by the military was spasmodic and reliable statistics of the local industry are not available. Most of the cars were of American make. The small English car, however, is gaining favour with the foreign population in Tientsin; it has, however, little vogue in Peking.—Tientsin Customs Report, 1925.

Zoong Sing Cotton Mills, Shanghai.—The Zoong Sing Cotton Mills, Limited, with a registered office at 8 Rue du Consulat, Shanghai, showed a net profit of Tls. 301,380.89 for the year ending June 30, 1926, according to the annual report delivered at the seventh general meeting on October 6, 1926. Out of the profit a total of Tls. 90,000 will be paid in dividends, making Tls. 0.60 per share. The company has an authorized capitalisation of Tls. 2,000,000 at Tls. 10 a share. It's paid up capital is Tls. 1,500,000.

Dah Sun Hosiery Company, Shanghai.—The Dah Sun Hosiery Company of Canton has taken over the Lien Bik Knitting Mill, Shanghai. It will manufacture and market hosiery under the trade mark of "Red Horse." The factory has 60 machines, employs about 80 workers, and produces about 90 dozens of socks and stockings per day. It also manufactures gloves, scarves, and underwear. It has a store at 153 Nanking Road, Shanghai. Its manager is Li Yen-chih. The head office is located at Hsi Kua Yuan, Canton. The most expensive silk socks are sold at $15 per dozen and the cheapest at $10.80. The most expensive silk stockings are sold at $20 per dozen and the cheapest at $12.60.

New Bridge at Mukden.—The Mukden paper reports that the South Manchuria Railway Company is now constructing an iron bridge at the old station, with a view to improving communications and preventing accidents. The estimated value of this bridge is $200,000, 3-10 of which will be paid by the Peking-Mukden Railway on account of transportation facilities extended to them.

Dah Wah Engineering Company, Shanghai.—The Dah Wah Engineering Company has been organized with an office at 287 North Chekiang Road, Shanghai. It will undertake all kinds of electric engineering work. The manager is Nielcom Wang.

Waste Cotton Mill in Shanghai.—The Ku Tien Cheng Waste Cotton Mill has moved to a new building at the corner of North Chengtu and West Soochow Roads, Shanghai. The land, 3.7 acres in area cost Tls. 128,000, and the building, Tls. 23,000. Formerly, it turned out 100 piculs of cotton daily; now the output is 250 piculs. The cotton is obtained by picking the waste. 300 men and 70 women are employed. The old building in North Szechuen Road is now used as a godown. The raw material is supplied from the Shanghai cotton mills. Trade marks are Shang Mei, San Feng, Yu Cheng, Chen Tung Yung, Tung Yung and Yu Li. The proprietor is Ku Yung-foo.

A New Paint and Varnish Company.—The Yung Koo Paint and Varnish Company Ltd., Li Yuan Road, St. Catherine's Bridge, Shanghai, has been organized by Chen K'ang-chih. The company is capitalized at $100,000, 72 per cent. of which has already been subscribed. The company will manufacture washable paint and varnish. Its machinery is imported from the United States, and its raw materials are partly imported from Europe and the Straits Settlements. The company is entirely Chinese. Its product is expected to be less expensive than that imported on account of the proximity of wood oil. The company is the third Chinese concern of its kind in Shanghai. The other two are Kai Ling and Chen Hua.

Manufacture of Oil Colors.—Marie and Co., has recently added a department for the manufacture of oil colors. The company is a purely Chinese concern, organized in May, 1919. Its factory is located in Kiangwan near the Kiangwan Recreation Ground, and its sales office in Kwang An Li, Paoshan Road, Chapei, Shanghai. The manager is Hsu Pao-sheng. The company turns out 12 water colors: vermilion, ultramarine, Prussian blue, light red, yellow ochre, burnt sienna, crimson lake, Chinese white, Hooker's green, sap green, mauve, and chrome yellow; and 12 showcard colors: dark blue, light blue, dark red, light red, dark green, light green, violet, white, brown, orange, yellow, and black. According to its new plan, it will manufacture nine oil colors: lemon yellow, zinc white, ivory black, cadmium yellow, rose madder, emerald green, virdian tint, flake white, and cobalt blue.

Wireless Communication between Tientsin and Sinkiang.—The wireless station at Tientsin has resumed communication with Mukden, Kalgan, and Suiyuan. Trial messages have also been sent to and received from Tihwa Urumchi), Sinkiang province.

Shanghai Electric Construction Co., Ltd.—The Shanghai Electric Construction Co., Ltd., 7-8 Soochow Road, Shanghai, began on October 1 to pay first interim dividend in sterling at the rate of 4 per cent. less income tax at 4s in the £ in respect of the year ending December 31, 1926, at the Eastern Bank, Ltd., 4 Crosby Square, London E.C. Payment may also be negotiated in Shanghai currency at the demand buying rate on London for coupons on date of lodgment at the Hongkong & Shanghai Banking Corporation, Shanghai.

Southeastern Wireless Administration.—The Southeastern Wireless Administration was officially inaugurated on August 15 in Shanghai. The administration has four departments: a Department of General Affairs, an Engineering Department, a Revenue Department and an Inspection Department. It has control over the provinces of Kiangsu, Chekiang, Fukien, Kiangsi, and Anhwei. At present three wireless stations are under the control of this administration, namely, the Woosung Wireless Station, the Nanking Wireless Station, and the Foochow Wireless Station. The administration will formulate plans for the development of wireless communication for commercial purposes. The administration is occupying a part of the Chinese Telegraph Administration building at the corner of Foochow and Szechuen Roads, Shanghai.

Air Service Between Osaka and Shanghai.—A tentative plan for an Osaka-Shanghai air mail and passenger service has been arranged between Chinese interests and S. Bando, managing director of the Nippon Kooku Kabushiki Kaisha, Kobe. The plan calls for a trial flight of three aeroplanes from Osaka *via* Fukuoka and Mopoo to Shanghai. The entire distance between Osaka and Shanghai can be covered in 11 hours and half: from Osaka to Kukuoka in 3 and half hours; from Fukuoka to Mopoo in 4 hours; and from Mopoo to Shanghai in 4 hours. The Kawanishi No. 7 type is being used. Hung Yun-chung has been appointed inspector. If the trial flights are successful, new aeroplanes will be ordered from Germany for the air mail service. The Shanghai station will be located in the vicinity of Black Point, Shanghai, which was selected by Mr. Bando's Japanese pilots who came with him to Shanghai. The company is capitalized at Y.2,000,000. An additional Y.1,000,000 will be added in two years. The company has 20 pilots and 25 engineers. The head office is at 114, Kawasakicho, Kobe, and the factory at 1, Otake, Shirüke, Kyago, Kobe. Four hangars have been leased at Osaka, Beppu, Kulsuoka and Dairen.

Canton to Instal Automatic Telephone Service.—The municipal authorities of Canton have recently signed a contract with an American firm for the installation of 4,000 automatic telephones, each provided with an automatic switchboard, at a cost of G. $700,000 or $1,700,000, Canton local currency. According to the terms of the contract, the American firm is to furnish all machinery and engineering work, while the Canton Government supplies buildings and labor. One-third of the total cost of equipment is to be paid within one month after the installation of the whole system, which, it is estimated, requires only 18 months. The remainder to be paid in monthly instalments from the receipts of the telephone service. It is also stipulated that before the total sun is fully paid, the American firm has the right of inspection of the accounts of the Canton Telephone Administration. For the installation of a new automatic telephone, the Administration charges $300, but a discount of $100 is given to all old subscribers who pay within three months after the signing of the contract with the American firm. After the installation of the new system, the old service will be abolished. Installation of the 100 automatic telephones in the official organs is now in progress and will be completed in three weeks.

Japanese Highways.—The home department of the Japanese government has decided on a tentative construction program for the improvement of highways, particularly for motor traffic, the cost of which is estimated at about 160,000,000 yen, to be spread over a period of about 10 years, says *Commerce Reports*.

The government will contribute toward this fund approximately 50,000,000 yen, the remainder to be supplied by the prefectures and cities benefiting. There are now about 53,000 miles of highways in Japan, of which 14,500 miles have been recommended as main roads for motor vehicles and 4,880 miles have been set aside as important highways for automotive traffic. It is this mileage which will be placed in condition first.

Periode A. Chien

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Vol. XXII December, 1926 No. 12

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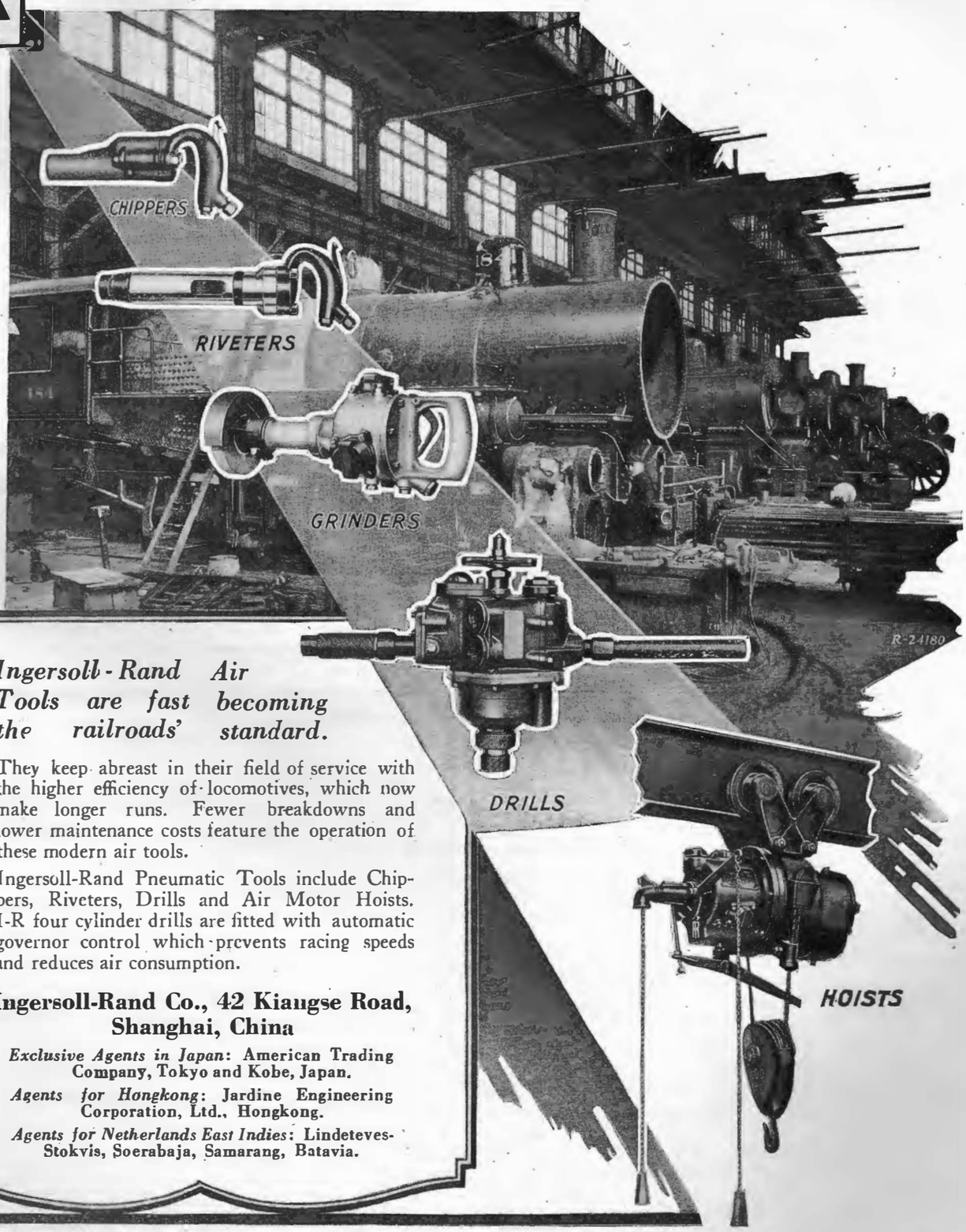

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